Y4.En2/3:99-75

REGULATORY IMPLICATIONS OF THE DAVIS-BESSE MISHAP

MF188 ORIGINAL
COMPLETED
532

HEARING

BEFORE THE

SUBCOMMITTEE ON
ENERGY CONSERVATION AND POWER

OF THE

COMMITTEE ON
ENERGY AND COMMERCE
HOUSE OF REPRESENTATIVES

NINETY-NINTH CONGRESS

FIRST SESSION

OCTOBER 2, 1985

Serial No. 99-75

Printed for the use of the Committee on Energy and Commerce

REGULATORY IMPLICATIONS OF THE DAVIS-BESSE MISHAP

HEARING

BEFORE THE

SUBCOMMITTEE ON
ENERGY CONSERVATION AND POWER

OF THE

COMMITTEE ON
ENERGY AND COMMERCE
HOUSE OF REPRESENTATIVES

NINETY-NINTH CONGRESS

FIRST SESSION

OCTOBER 2, 1985

Serial No. 99-75

Printed for the use of the Committee on Energy and Commerce

U.S. GOVERNMENT PRINTING OFFICE
60-621 O WASHINGTON : 1986

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

I

COMMITTEE ON ENERGY AND COMMERCE

JOHN D. DINGELL, Michigan, *Chairman*

JAMES H. SCHEUER, New York
HENRY A. WAXMAN, California
TIMOTHY E. WIRTH, Colorado
PHILIP R. SHARP, Indiana
JAMES J. FLORIO, New Jersey
EDWARD J. MARKEY, Massachusetts
THOMAS A. LUKEN, Ohio
DOUG WALGREN, Pennsylvania
BARBARA A. MIKULSKI, Maryland
AL SWIFT, Washington
MICKEY LELAND, Texas
RICHARD C. SHELBY, Alabama
CARDISS COLLINS, Illinois
MIKE SYNAR, Oklahoma
W.J. "BILLY" TAUZIN, Louisiana
RON WYDEN, Oregon
RALPH M. HALL, Texas
DENNIS E. ECKART, Ohio
WAYNE DOWDY, Mississippi
BILL RICHARDSON, New Mexico
JIM SLATTERY, Kansas
GERRY SIKORSKI, Minnesota
JOHN BRYANT, Texas
JIM BATES, California

JAMES T. BROYHILL, North Carolina
NORMAN F. LENT, New York
EDWARD R. MADIGAN, Illinois
CARLOS J. MOORHEAD, California
MATTHEW J. RINALDO, New Jersey
WILLIAM E. DANNEMEYER, California
BOB WHITTAKER, Kansas
THOMAS J. TAUKE, Iowa
DON RITTER, Pennsylvania
DAN COATS, Indiana
THOMAS J. BLILEY, Jr., Virginia
JACK FIELDS, Texas
MICHAEL G. OXLEY, Ohio
HOWARD C. NIELSON, Utah
MICHAEL BILIRAKIS, Florida
DAN SCHAEFER, Colorado
FRED J. ECKERT, New York

Wm. Michael Kitzmiller, *Staff Director*
Thomas M. Ryan, *Chief Counsel*
Arnold I. Havens, *Minority Counsel*

Subcommittee on Energy Conservation and Power

EDWARD J. MARKEY, Massachusetts, *Chairman*

AL SWIFT, Washington
JOHN BRYANT, Texas
MICKEY LELAND, Texas
RICHARD C. SHELBY, Alabama
RON WYDEN, Oregon
RALPH M. HALL, Texas
DENNIS E. ECKART, Ohio
GERRY SIKORSKI, Minnesota
JOHN D. DINGELL, Michigan
(Ex Officio)

CARLOS J. MOORHEAD, California
MICHAEL G. OXLEY, Ohio
HOWARD C. NIELSON, Utah
MICHAEL BILIRAKIS, Florida
FRED J. ECKERT, New York
JAMES T. BROYHILL, North Carolina
(Ex Officio)

Lawrence Sidman, *Chief Counsel/Staff Director*
Richard A. Udell, *Nuclear Analyst*
Robert G. Fitzgibbons, *Associate Minority Counsel*

CONTENTS

Page

Statement of:
  Asselstine, James K., Commissioner, NRC 53
  Kaptur, Hon. Marcy, a Representative in Congress from the State of Ohio 6
  Palladino, Nunzio J., chairman, Nuclear Regulatory Commission 7
  Williams, Adm. Joe, Jr., Senior Vice President for Nuclear Energy, NRC 86
  Zech, Lando W., Jr., Commissioner, NRC 55
Additional information supplied by:
  Energy Subcommittee:
    Letter to Hon. Palladino dated:
      June 17, 1985 194
      June 27, 1985 317
      Sept. 20, 1985 454
  Nuclear Regulatory Commission:
    Additional written material in response to Representative Markey's letter of Sept. 17, 1985 10
    Davis-Besse course of action, Volume 1 89
    Letter to Hon. Markey dated:
      July 17, 1985 200
      July 24, 1985 323
      Oct. 18, 1985 419
      Sept. 25, 1985 455
      Sept. 30, 1985 458
      Dec. 16, 1985 487

REGULATORY IMPLICATIONS OF THE DAVIS-BESSE MISHAP

WEDNESDAY, OCTOBER 2, 1985

House of Representatives,
Committee on Energy and Commerce,
Subcommittee on Energy Conservation and Power,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:45 a.m., in room 2322, Rayburn House Office Building, Hon. Edward J. Markey (chairman) presiding.

Mr. Markey. This is a hearing of the Energy Conservation and Power Subcommittee, a hearing into the implications of the June 9, 1985 loss of feedwater at the Davis-Besse Nuclear Power Plant in Toledo.

I apologize for the tardy commencement of the hearing. There is a tax caucus of the Democratic Party on the floor of the House right now and the Democratic Party is trying to decide which direction they should go in terms of that legislation. I was participating in that and I apologize for the delay.

Beginning at approximately 1:30 on the morning of June 9, 1985, the Davis-Besse Nuclear Power Plant suffered a series of failures leading to one of the most serious nuclear mishaps since the 1979 accident at Three Mile Island. The Nuclear Regulatory Commission has concluded that the underlying cause of the incident was Toledo Edison's "lack of attention to detail in the care of plant equipment." Many problems, according to the NRC, were treated by the utility "in a superficial manner and, as a result, the root causes of the problems were not always found and corrected." How could this happen? Where the principal lessons of TMI forgotten or simply never learned?

It is now public knowledge that Toledo Edison had serious management problems that affected the safe operation of Davis-Besse. And it is now known that among its many problems, and the feedwater system at Davis-Besse was poorly designed and that its failure posed a higher risk of leading to a core melt down than any accident scenario at any plant.

But, for the past 6 years, these facts appear to have been the closely guarded secrets of the NRC and Toledo Edison. So, while it is true that we have learned many unsettling things from and about this mishap, perhaps the most disturbing is the degree to which the NRC had prior knowledge of management problems and design defects at the plant yet failed to take effective corrective action. Indeed, as highlighted in the Commission's own testimony, even increased NRC inspection efforts failed to prevent what happened on June 9. What does this say about NRC's nuclear inspection and enforcement program?

Two examples underscore the extent of NRC's practice of benign neglect. First, an NRC report on Toledo Edison's management found it sorely lacking in 5 of 11 areas after improvements were to have been made. The Commission has subsequently informed the Committee that the root causes of poor mangement at Davis-Besse included the failure of the Chief Executive Officer, the president, the Nuclear vice president, the Nuclear assistant vice president and the plant manager.

Second, a 1980 internal NRC memorandum highlighted the fact that a 1979 recommendation termed "highest priority" to install a third auxiliary feedwater pump at Davis-Besse had not yet been implemented and warned that it should be required "as soon as possible" because 1 year was "too long a time to merely study such an important issue." Instead, 5 more years without corrective action was allowed to pass. These two issues have led me to conclude that Davis-Besse was an accident waiting to happen.

In light of the Davis-Besse experience, the subcommittee has asked the NRC what assurances it can provide the Congress and the American people that there are not other plants with accidents waiting to happen because of the regulatory failure of the NRC. NRC's response is unsettling, to say the least. The Commission has refused my request for an independent internal investigation of NRC's responsibility for the Davis-Besse incident and has failed to undertake an internal investigation of its own.

Rather than viewing an internal investigation as a necessary part of their responsibility to assure public health and safety, several Commissioners have opposed such internal trouble shooting because it might delay restart of the plant. In other words, let's not look back, let's ignore history, let's not question NRC's responsibility for this incident, but instead let's just make sure Davis-Besse is operating as soon as possible. Clearly this is an inappropriate regulatory posture for those responsible for assuring public health and safety.

The Commission is, however, looking at the implications of the Davis-Besse mishap or other nuclear plants. The subcommittee has asked for a report on this subject and asked that the Commission address what efforts are underway in its testimony today.

One issue of broad regulatory importance that the subcommittee has been investigating involves the NRC's use of "grandfathering" or exempting nuclear power plants from NRC regulations. The NRC has informed the subcommittee that no Babcock and Wilcox (B&W) reactor—the same company that designed both Three Mile Island and Davis-Besse—fully complies with current regulatory requirements.

The Commission has asserted that this is acceptable because these regulations are not required for reactors licensed after they were developed. Plants designed by other vendors also fail to comply with current NRC regulations.

I was led to believe that the lessons of TMI had been learned not lost. I do not understand why Davis-Besse was allowed to operate with a defective design instead of being required by the NRC to meet up-to-date and sensible safety standards particularly when the safety issue involved—reliability of feedwater—was specifically identified as critical to safety by the TMI accident. This raises the question of which regulations apply to which plants and whether the use of grandfathering by the Commission has an adequate technical basis.

A separate and related question centers around the fact that the Davis-Besse auxiliary feedwater system failed to even perform at the predicted low rate of reliability. Contrary to the Commission's unsupported and unsupportable assertion that this has no implications for the supposed reliability of risk assessment, an internal NRC memorandum by the agency's risk experts correctly states that estimates of the probability of severe accidents may need to be revised in light of Davis-Besse.

A similar question relates to the NRC's newly enacted backfitting regulations. It is by no means clear that the new pump at Davis-Besse would be required under this policy. If a safety improvement cannot be ordered to correct a design deficiency that has been identified as the single most likely accident sequence to lead to a core melt down, than what is the purpose of that policy? Has the Commission at long last bowed to the enormous pressure of the nuclear industry and implemented a policy whose actual intent is to prevent safety improvements.

Additionally, it is inconceivable to me how three Commissioners could assert that the backfit rule was well thought out and would establish, quote, "criteria and a system for rational decision making", when their response to prehearing questions reveals that they cannot define the standard that must be met to require a backfit and that there is no methodology, procedure or set of criteria to determine if this standard is met.

This is another example of voodoo regulation. Also at issue, because of Davis-Besse, is the validity of the Commission's recently finalized, quote, "policy statement on severe reactor accidents."

The Commission has stated that no reactor poses an "undue risk" to public health and safety. The policy fails to state either the basis for this "belief" or what uncertainty is implicit in this judgment.

But the real $64,000 dollar question is: knowing what we now know, did the conditions under which Davis-Besse was allowed to operate pose an undue risk to the public? If the Commission answers yes, it means their judgment about plant safety has been proven wrong and our degree of confidence in it should be appropriately qualified; if the answer is no, then it is clear the policy is meaningless and should be accorded no weight at all.

Another matter with implications beyond Davis-Besse concerns the financial qualifications of nuclear utilities. The Commission has informed the subcommittee that management problems at the plant which were responsible for the June 9th mishap were to some extent attributable to Toledo Edison's questionable financial condition.

In addition to being a very significant finding, this appears to contradict the Commission's publicly stated position that no financial reviews of operating utilities are required since economic considerations have never interferred with safety.

The Commission's final rule to eliminate financial reviews also states that the ratemaking process "assures that regulated utilities will have the financial resources needed to operate safely". However, subsequent to the Commission's decision to stop conducting such reviews as part of regulatory process, there has been a spate of large and unprecedented cost disallowances by State public utility commissions.

One such disallowance concerning the Arkansas nuclear reactors led the Executive Director for Operations to write a memorandum to the Commission stating that the utility would be closely monitored by the NRC staff. However, this is precisely what NRC's rulemaking in this are refused to provide.

The subcommittee looks forward to hearing today from the Commission and the Toledo Edison Company about the Davis-Besse incident, its generic implications and efforts that have or will be taken to provide for the safety of those living and working near nuclear power plants, not only in Ohio but around the Nation.

I want to thank, in particular, the members of the Ohio delegation that have taken a strong interest in this matter. Representative Kaptur first called my attention to this issue and it has proved to be a very important investigation for the subcommittee.

With that, I conclude my opening statement and recognize the ranking minority member of the subcommittee, the gentleman from California, Mr. Moorhead.

Mr. MOORHEAD. Thank you very much.

I want to thank the Commissioners and Admiral Williams for appearing before us today. I think we all agree on the seriousness of the Davis-Besse incident last June, particularly the possibility that inadequate attention to maintenance may have contributed to the multiple equipment failures.

I share the Chairman's commitment to fully understand the implications of this event. However, there are also some positive aspects to this event that I find encouraging.

First, to the extent management problems have been involved, such deficiencies have been identified long before the event occurred and Toledo Edison had already taken important steps to elevate performance at Davis-Besse.

Admiral Williams' presence today is itself testimony to Toledo Edison's commitment for promoting excellence.

Second, the operators during the events was nothing short of extraordinary. Despite multiple equipment failures, the operators were able to bring the plant safely to shut down and prevent any abnormal release of radiation and any major damage to the plants and we are doing something right on operator training.

I think the industry, Toledo Edison and the NRC should be commended in this regard.

However, this incident does raise some important questions as to whether the NRC is as effective as it should be. Part of the problem is undoubtedly the fact that our regulatory and licensing process has encouraged customized nuclear plants. Failure to standardize nuclear plants has condemned us to remain in a reactive posture.

We are trying to use ad hoc measures and hindsight to correct problems that would have been resolved had we focused resources on standardized plant design.

Further, our customized plants preclude the possibility of standardized construction, quality assurance and most importantly, with respect to Davis-Besse, maintenance programs. My observations are not new.

The company commission investigating Three Mile Island said the same things about the way we licensed and regulate nuclear power and despite the efforts of the Nuclear Regulatory Commission, and I want to commend the Commission for its new backfitting regulation, they cannot make all the necessary reforms administratively.

I appreciate the Chairman's willingness to address licensing and regulatory problems. The hearing held on June 25 to examine the problems of the nuclear industry was an important first step.

I look forward to the subcommittee's next hearing on this subject which I hope will examine the licensing reform bills presently before our subcommittee.

Congress must act on legislation to improve the licensing and regulatory process. Failure to do so simply puts our seal of approval on the disjointed and reaction oriented regulatory and licensing process that brought us here today.

It is time to look at these problems in a comprehensive fashion.

Mr. **Markey**. The gentleman's time has expired.

The Chair recognizes the gentleman from Florida, Mr. Bilirakis.

Mr. **Bilirakis**. I have no opening statement, Mr. Chairman.

Mr. **Markey**. The Chair recognizes the gentleman from Ohio, Mr. Eckart.

Mr. **Eckart**. I thank the Chairman.

Mr. Chairman, members of the committee, we have been over the detail of this accident, as my colleague from northwestern Ohio is all too familiar. I think the fundamental concern that has emerged, at least from my perception is what are the generic issues raised by the accidents at Davis-Besse? How will the Davis-Besse accident affect the future of nuclear power in this country or how better yet will it affect the ability of the Nuclear Regulatory Commission to deal with problems in the nuclear industry?

One such generic issue deals with the Nuclear Regulatory Commission's policy on backfit. According to one of the Commissioners, this new rule has the effect of saying that nuclear risks are so acceptable and so well understood that the burden of proof for lowering the risk to the public must be placed on the safety proponents, not the industry even if the safety proponent is the NRC itself.

In view of what just happened at Davis-Besse, a plant at which the NRC itself knew for 8 years that there were serious management, and thus safety, problems, and yet did not force action necessary to meet even their own recommendations, what can this mean for the balance of the nuclear industry as well?

Another generic issue is the financial qualifications of the utilities involved. One source has indicated to our subcommittee that one of the reasons Toledo Edison did not undertake safety improvements at Davis-Besse was focusing on economics and the plant's cash flow.

If economics interfere with safety, how did the NRC allow this to happen?

Now, Mr. Chairman, we understand that the constituents and consumers of power from the Davis-Besse plant potentially will be exposed to $31 million in purchased power to replace the electricity that they no longer are capable of generating themselves.

What happens to that debt when Davis-Besse restarts? What happens to that debt in getting passed on to the ratepayers?

Ultimately will the public have to pay for Toledo Edison's and NRC's negligence? Such ill-conceived policies as this new backfit rule, the question of the public paying a price far higher than that which would have occurred if NRC and the utility had done their job to begin with, raise serious questions about the future and about the cost of the public paying for the industries and the regulators' mistakes.

Mr. MARKEY. Thank you. The gentleman's time has expired.

The Chair recognizes the gentlewoman from Ohio, Marcy Kaptur, who although not a member of our subcommittee, has drawn this issue to our attention and we welcome her to our subcommittee once again and would ask if you would like to make an opening statement.

STATEMENT OF HON. MARCY KAPTUR, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OHIO

Ms. KAPTUR. Thank you, Mr. Chairman.

I just wanted to thank you for your courtesy and all the members of the committee for your courtesy in allowing me to sit in on these hearings. I commend the committee for their thorough investigation, the manner in which you have conducted these hearings over the last several months.

I can tell by the testimony that will be presented today as well as the actions that Toledo Edison is taking with regard to Davis-Besse, that the plant will not be reopened until the safety of the citizens of northwestern Ohio is fully guaranteed, and, of course, that is very important to us.

I am hopeful that the unfortunate experience that we have had in northwest Ohio will be able to contribute to the improvement of procedures within the Nuclear Regulatory Commission so that other nuclear powerplants around the country will not face similar very, very serious situations.

So I am most anxious to hear from the Commission and from the Edison Company. Again, I thank the Chairman for his courtesy.

Mr. MARKEY. Thank you very much.

So now we turn to our first panel which consists of the Nuclear Regulatory Commission and some of their staff. It is led by the Chairman of the Nuclear Regulatory Commission, Nunzio Palladino.

We would recognize you at this time, sir, for an opening statement and then any other members of your group that wish to address us in an opening statement would be—we would be more than willing to listen.

Mr. Chairman, if you would, would you please begin your testimony.

STATEMENTS OF NUNZIO J. PALLADINO, CHAIRMAN, NUCLEAR REGULATORY COMMISSION, ACCOMPANIED BY JAMES K. ASSELSTINE, LANDO W. ZECH, JR., THOMAS M. ROBERTS, AND FREDERICK M. BERNTHAL, COMMISSIONERS; WILLIAM J. DIRCKS, EXECUTIVE DIRECTOR FOR OPERATIONS; HERZEL H.E. PLAINE, GENERAL COUNSEL; STEPHEN BURNS, OFFICE OF EXECUTIVE LEGAL DIRECTOR; JAMES G. KEPPLER, REGION III ADMINISTRATOR; HAROLD R. DENTON, DIRECTOR OF NUCLEAR REACTOR REGULATIONS; AND VICE ADM. JOE WILLIAMS, JR., SENIOR VICE PRESIDENT FOR NUCLEAR ENERGY, TOLEDO EDISON CO., ACCOMPANIED BY JOHN WOOD, MANAGER, CONSTRUCTION ENGINEERING

Mr. **Palladino.** Thank you, Mr. Chairman.

Mr. Chairman, and members of the subcommittee, in response to your invitation, we are prepared to discuss with you the follow-up actions resulting from the Davis-Besse loss-of-feedwater event that occurred on June 9, 1985. I will give a brief overview of the event and the Nuclear Regulatory Commission's response to it.

Commissioners Roberts, Asselstine and Zech are here with me today, along with William Dircks, the executive director for operations, Harold Denton, the Director of Nuclear Reactor Regulation, James Keppler, the Administrator of Region III, and James Taylor, the Director of Inspection and Enforcement.

Mr. Chairman, you will recall that the initial details of the Davis-Besse event were discussed with you in June. Briefly, on June 9, 1985, the Davis-Besse plant experienced a complete loss of all feedwater which led to a turbine and reactor trip.

Although there were other malfunctions, as well as human error, in responding to this transient, plant operators were successful in taking corrective actions within a quarter of an hour and in bringing the plant to a stable shutdown within half an hour. Effective operator action prevented any abnormal releases of radioactivity or any major plant damage.

The plant is in cold shutdown at this time. The licensee reports that troubleshooting is nearly complete, and that corrective actions and system modifications are in progress. The NRC field investigation has been completed and its findings are under review by the NRC staff. The licensee has developed a detailed program of actions needed before Davis-Besse may be restarted. This program is presently under staff review.

As early as 1979, NRC recognized the need to improve the reliability of auxiliary feedwater systems in pressurized water reactors. Prior to the June 9 event, improvements to the Davis-Besse system had already been made.

With respect to the need for an electrically driven, third pump, the licensee submitted additional analyses of possible alternatives for improving system reliability. After further discussion with the staff, the licensee, prior to the June 9 event, had committed to install such a pump at the next refuelling outage.

Even though analyses showed that, based on the staff's standard review plan, the calculated reliabliity of the Davis-Besse auxiliary feedwater system design was lower than desirable over the life of the plant, at no time did any of the analyses indicate that immediate corrective action was required. Such analyses are directed at the design of a particular system, and assume proper licensee installation, operation, maintenance, and postmaintenance testing. These assumptions proved, in part, to be invalid at Davis-Besse. In effect, the reliability analyses did not reflect the actual state of the auxiliary feedwater system. However, effective operator action compensated for this fact.

Therefore, the Davis-Besse problem was twofold: first, lack of diversity in system design and, second, inadequate management attention to those areas—installation, maintenance, testing, and operations—which ensure that the analysis assumptions remain valid over the life of the plant.

With respect to the first problem, the licensee is presently installing a third auxiliary feedwater pump, electrically driven, and making other modifications to improve system reliability.

Regarding the second problem, evidence of weak management performance by the utility was identified by the NRC over several years prior to the June 9, 1985 event. The staff increased its inspection effort and took a number of steps in an effort to improve Davis-Besse performance, including meetings with upper-level utility management and enforcement measures.

As a result, a number of corrective actions had already been taken at the time of the event, and in fact, Toledo Edison was in the process of a major management overhaul. Since the event, the licensee has made further management changes.

An investigation was conducted to understand the principal cause of the June 9 event at Davis-Besse. Steps have been taken to improve system reliability and management oversight of personnel performance in safety-related areas. Davis-Besse will not be allowed to restart until we are assured that remedial actions to correct both system and management deficiencies have been accomplished.

Going beyond Davis-Besse itself, the generic implications for other plants are also being evaluated. We have determined that there were no generic issues requiring immediate action by other licensees. However, we are issuing information notices to all licensees describing the event and its generic implications, and we are continuing our examination of these generic issues to determine appropriate regulatory measures.

In addition to the actions I have described, the Davis-Besse incident and our inquiries into it have indicated another area which the NRC must address; namely, our process for monitoring the performance of operating reactors. We must strive to ensure that significant deterioration in licensee performance is identified and corrected well before it becomes a threat to the public health and safety. Commissioner proposals as to how best to proceed, supplemented by staff comments, are now under Commission review.

This concludes my formal statement, Mr. Chairman. I believe I have addressed the principal issues in the Davis-Besse matter. We are submitting additional written material to address the specific issues mentioned in your September 17, 1985 letter.

Now, my fellow Commissioners and I, along with Mr. Dircks and other members of the NRC staff, are prepared to answer your questions.

Thank you.

[Testimony resumes on p. 53.]

[The material referred to follows:]

ADDITIONAL WRITTEN MATERIAL IN RESPONSE TO REPRESENTATIVE MARKEY'S LETTER OF SEPTEMBER 17, 1985

THE FIRST PARAGRAPH OF THE SUBCOMMITTEE'S LETTER OF SEPTEMBER 17, 1985, OUTLINES THE GENERAL TOPICS TO BE DISCUSSED AT THE OCTOBER 2ND HEARING. WE HAVE LETTERED THESE TOPICS A-F, AS SHOWN ON THE ATTACHED COPY OF THE LETTER, AND OUR ANSWERS ARE IN SECTION I OF THE ADDITIONAL WRITTEN MATERIAL.

THE SECOND PARAGRAPH OF THE SUBCOMMITTEE'S LETTER CONTAINS QUESTIONS NUMBERED 1-6. OUR ANSWERS TO THESE QUESTIONS ARE IN SECTION II OF THE ADDITIONAL WRITTEN MATERIAL.

NINETY-NINTH CONGRESS

EDWARD J. MARKEY, MASSACHUSETTS, CHAIRMAN

AL SWIFT, WASHINGTON
JOHN BRYANT, TEXAS
MICKEY LELAND, TEXAS
RICHARD C. SHELBY, ALABAMA
RON WYDEN, OREGON
RALPH M. HALL, TEXAS
DENNIS E. ECKART, OHIO
GERRY SIKORSKI, MINNESOTA
JOHN D. DINGELL, MICHIGAN
(EX OFFICIO)

CARLOS J. MOORHEAD, CALIFORNIA
MICHAEL G. OXLEY, OHIO
HOWARD C. NIELSON, UTAH
MICHAEL BILIRAKIS, FLORIDA
FRED J. ECKERT, NEW YORK
JAMES T. BROYHILL, NORTH CAROLINA
(EX OFFICIO)

LAWRENCE R. SIDMAN
CHIEF COUNSEL AND STAFF DIRECTOR

U.S. HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON ENERGY CONSERVATION
AND POWER
OF THE
COMMITTEE ON ENERGY AND COMMERCE
WASHINGTON, DC 20515

ROOM H2-316
HOUSE OFFICE BUILDING ANNEX NO. 2
PHONE (202) 226-2424

September 17, 1985

The Honorable Nunzio J. Palladino
Chairman
U.S. Nuclear Regulatory Commission
1717 H Street, N.W.
Washington, D.C. 20555

Dear Mr. Chairman:

As has previously been communicated with your staff, the Commission is invited to testify before the Subcommittee on October 2, 1985 at 9:30 a.m. The hearing will focus on the A Davis-Besse incident and the Commission's treatment of B known management problems and C design defects at the plant prior to June 9, 1985. The Subcommittee will also examine what D corrective actions NRC has or will require in response to the mishap prior to and after restart, E the results of the NRC's consideration of the extent to which it could have prevented the incident and the F generic implications for other plants.

In addition to the above, your testimony should include the following: (1) an overview of known management problems and auxiliary feedwater design weaknesses at Davis-Besse prior to the June 9th incident; (2) NRC's awareness of these issues and any corrective actions taken prior to June 9th; (3) a listing of each failure that occurred during the June 9th incident specifying the cause and the estimated probability of the failure based on NRC probabilistic risk analyses and precursor data; (4) an estimate of the probability of the combination of failures that occurred during the June 9th incident based on NRC probabilistic risk analyses and precursor data; (5) an explanation of how the issue of a third auxiliary feedwater pump would have been treated under the Commission's new Backfit Rule; and (6) a detailed definition of the term "substantial increase in overall protection" in the Backfit Rule and a complete explanation of the methodology and criteria that NRC will use to determine if this standard is or is not met.

The Subcommittee requests that William J. Dircks, Harold R. Denton, and James Keppler of the NRC Staff also attend the hearing and be prepared to respond to any questions that arise.

In accordance with Committee rules, please provide 20 copies of your testimony to the Subcommittee by September 30, 1985. An additional 80 copies of your testimony should be brought to the hearing room by 9:00 a.m. on the day of the hearing for distribution to Members of the Subcommittee, the public and the press. While your detailed written statement for insertion in the hearing record may be of any length, it should be doubled space and include a one-page summary. If you have any questions about your hearing appearance, please contact Richard A. Udell of the Subcommittee Staff.

Thank you for your assistance in this matter.

Sincerely,

Ed Markey

Edward J. Markey
Chairman

EJM:mw

ADDITIONAL WRITTEN MATERIAL

SECTION I

INTRODUCTION QUESTION A. DESCRIBE THE DAVIS BESSE INCIDENT.

ANSWER TO INTRODUCTORY QUESTION A - Page 1 of 1

DESCRIPTION OF DAVIS BESSE EVENT - LOSS OF ALL MAIN FEEDWATER
AND AUXILIARY FEEDWATER JUNE 9, 1985

- Loss of one main feedwater pump at 90% power.
- Reactor trip at 78% power on high pressure.
- Both MSIVs close tripping remaining main feedwater pump.
- Steam generator low level starts both auxiliary feedwater pumps but both trip on overspeed.
- No feedwater available for about eight minutes and steam generator levels fell to about eight inches.
- PORV cycles three times - did not reseat on third cycle, operators close block valve.
- Startup feedwater pump used to feed one steam generator.
- Operators restart auxiliary feedwater pumps and restore normal post-trip conditions.
- No indication that subcooling margin was lost or that reactor coolant activity was abnormal.
- Plant now in cold shutdown.

INTRODUCTION QUESTION B. DESCRIBE THE COMMISSION'S TREATMENT OF KNOWN MANAGEMENT PROBLEMS AT THE PLANT PRIOR TO JUNE 9, 1985.

ANSWER TO INTRODUCTORY QUESTION B - Page 1 of 3

NRC ACTIONS
PRIOR TO JUNE 9, 1985 TO
ADDRESS LICENSEE PERFORMANCE
PROBLEMS AT DAVIS-BESSE

- A MANAGEMENT MEETING IN NOVEMBER 1983 WHICH RESULTED IN THE COMPANY INITIATING A PERFORMANCE ENHANCEMENT PROGRAM (PEP).
- APPROXIMATELY MONTHLY MEETINGS WITH THE LICENSEE AT THE BRANCH CHIEF AND SECTION CHIEF LEVEL TO PROVIDE INPUT TO THE PEP AND PERIODIC SENIOR MANAGEMENT MEETINGS TO MONITOR AND ASSESS PEP PROGRESS.
- ASSIGNMENT OF A SECOND RESIDENT INSPECTOR IN JANUARY 1984.
- CONDUCT OF A SPECIAL QUALITY ASSURANCE PROGRAM INSPECTION AND A PERFORMANCE APPRAISAL TEAM INSPECTION IN 1984.
- A MANAGEMENT MEETING AMONG THE PRESIDENT OF TOLEDO EDISON, THE DIRECTOR, OIE, AND THE REGIONAL ADMINISTRATOR IN NOVEMBER 1984 TO DISCUSS THE NEED FOR IMPROVED LICENSEE COMMUNICATION AND SUPPORT FOR PROGRAM IMPROVEMENTS.
- THE ASSESSMENT OF A $90,000 CIVIL PENALTY IN NOVEMBER 1984 FOR VIOLATIONS RELATED TO A BREAKDOWN IN THE LICENSEE'S MANAGEMENT CONTROL SYSTEM.
- A PUBLIC SALP MEETING IN DECEMBER 1984 TO DISCUSS THE APPRAISAL WHICH RESULTED IN FIVE CATEGORY 3 RATINGS AND THE REGIONAL ADMINISTRATOR PUBLICLY STATING THAT "A CONTINUANCE OR FURTHER DECLINE OF THIS PERFORMANCE LEVEL IS UNACCEPTABLE TO ME".
- A MEETING BETWEEN THE CHIEF EXECUTIVE OFFICER (CEO) AND THE REGIONAL ADMINISTRATOR IN DECEMBER 1984 TO DISCUSS PROBLEMS AND TO URGE THE CEO TO BRING IN OUTSIDE MANAGEMENT ASSISTANCE TO DEAL WITH DAVIS BESSE PROBLEMS.
- THE ISSUANCE OF TWO CONFIRMATORY ACTION LETTERS (CALS) IN 1985 ADDRESSING THE FAILURE OF CONTROL ROD DRIVE MECHANISM LEAF SPRINGS, AND DAMAGE SUSTAINED TO SEVERAL AUXILIARY STEAM SUPPLY FEED PUMP TURBINE PIPING RESTRAINTS.
- A COMMISSION BRIEFING IN FEBRUARY 1985 WHERE PERFORMANCE PROBLEMS AT DAVIS-BESSE WERE DISCUSSED.
- A FOLLOW-UP MEETING BY THE REGIONAL ADMINISTRATOR WITH THE CEO IN MAY 1985 TO REVIEW ACTIONS BEING TAKEN TO IMPROVE REGULATORY PERFORMANCE.

ANSWER TO INTRODUCTORY QUESTION B - Page 3 of 3

Question

What is the history of the SALP (Systemmatic Appraisal of Licensee Performance) ratings; overall and those factors that relate to management, operations and maintenance.

Response

- SALP 1 (1980) - 2 areas need improvement
  - Emergency Planning
  - Security and Safeguards
- SALP 2 (1981) - 2 areas Category 3 (lowest)
  - Maintenance
  - QA
- SALP 3 (1982) - 1 area Category 3
  - Maintenance
- SALP 4 (1983/1984) - 5 areas Category 3
  - Maintenance
  - Fire Protection
  - Emergency Preparedness
  - Quality Programs and Administrative Controls
  - Training
- Summary - Since 1982, SALP rating for Davis-Besse declined
- Davis-Besse was considered one of the weakest plants in Region III

INTRODUCTION QUESTION C. DESCRIBE THE COMMISSION'S TREATMENT OF DESIGN DEFECTS AT THE PLANT PRIOR TO JUNE 9, 1985.

ANSWER.

SEE ANSWERS TO QUESTIONS 1 AND 2 BELOW.

INTRODUCTION QUESTION D. DESCRIBE THE CORRECTIVE ACTIONS NRC HAS, OR WILL, REQUIRE IN RESPONSE TO THE MISHAP PRIOR TO, AND AFTER, RESTART.

ANSWER.

SEE ATTACHED.

TOLEDO EDISON MILESTONES FOR DAVIS-BESSE RESTART

(1) COMPLETION OF THE INVESTIGATION OF THE JUNE 9 EVENT, INCLUDING ANALYSIS OF EQUIPMENT FAILURES AND OPERATOR ERRORS, DETERMINATION OF ROOT CAUSES AND THEIR IMPLICATIONS FOR RESTART, AND COMPLETION OF CORRECTIVE ACTIONS.

(2) COMPLETION OF PLANT-SPECIFIC FINDINGS REGARDING THE EVENT.

(3) RESOLUTION OF PROGRAMMATIC AND MANAGEMENT ISSUES THAT CONTRIBUTED TO THE EVENT AND MORE GENERALLY TO THE RECENT PERFORMANCE OF DAVIS-BESSE.

(4) DETERMINATION OF THE ADEQUACY OF PROCEDURES, EQUIPMENT, AND TRAINING FOR LOSS OF FEEDWATER MITIGATION.

(5) Determination of the adequacy of programs to resolve the likelihood of inadvertent isolation of AFW to both steam generators.

(6) Installation of Diverse Drive AFW Pump.

(7) Determination of the adequacy of other Engineered Safety Features Systems in light of single failure vulnerabilities identified in SFPCS and AFW systems.

(8) Determination of the significance of pipe support deficiencies.

STAFF MILESTONES FOR

DAVIS-BESSE RESTART

(1) THE FINDINGS AND CONCLUSIONS OF THE NRC INCIDENT INVESTIGATION TEAM (NUREG-1154) ISSUE IN JULY 1985.

(2) STAFF ACTION ITEMS ESTABLISHED BY THE EXECUTIVE DIRECTOR FOR OPERATIONS ON AUGUST 5, 1985.

(3) THE STAFF LETTER DETAILING AREAS OF CONCERN RELATED TO THE JUNE 9 EVENT TO TOLEDO EDISON PURSUANT TO THE CODE OF FEDERAL REGULATIONS, 10 CFR 50.54(F), ON AUGUST 14, 1985.

(4) TOLEDO EDISON MET WITH THE STAFF ON SEPTEMBER 4 AND WITH THE COMMISSION ON SEPTEMBER 17, 1985, TO PRESENT ITS CORRECTIVE ACTION PLAN.

(5) THE LICENSEE'S RESPONSE TO THE 50.54(F) LETTER WAS RECEIVED ON SEPTEMBER 12, 1985.

(6) THE STAFF IS NOW REVIEWING THE LICENSEE'S SUBMITTAL, WHICH INCLUDE THE LICENSEE'S ROOT CAUSE DETERMINATIONS AND CORRECTIVE ACTION REPORTS.

(7) THE STAFF IS INSPECTING ON AN ONGOING BASIS THE LICENSEES TROUBLESHOOTING ACTIVITIES RELATED TO EQUIPMENT FAILURES.

(8) A REVIEW OF THE LICENSEES MAINTENANCE PROGRAM WAS CONDUCTED AT THE SITE DURING THE WEEK OF SEPTEMBER 16, 1985.

RESTART EVALUATION ITEMS

- Derived from Staff Concerns in 50.54(F) Letter
- Completion of Event Investigation
  - Completion of the Investigation of Equipment Malfunctions and Operator Errors
  - Determination of Root Causes of the Malfunctions and Errors and Implications to the Restart of the Plant
  - Corrective Actions Needed to Assure the Reliability of Systems Which Mitigate Loss of Feedwater Events

BLANK PAGE

BLANK PAGE

BLANK PAGE

RESTART EVALUATION ITEMS (CONTINUED)

- Concerns Directly Related to June 9, 1985 Event

  Evaluate Licensee's Response to Concerns Identified in NUREG-1154:

  (1) Adequacy of Loss of Feedwater Analysis
  (2) Adequacy of Design/Operation of SFRCS
  (3) Physical Security and Administrative Features
  (4) Role of STA
  (5) Reliability of AFW Containment Isolation Valves and Other Safety-Related Valves
  (6) Adequacy of ENS Reporting
  (7) Reliability of AFW System, Pumps, and Need for Diverse Pump

RESTART EVALUATION ITEMS (CONTINUED)

(8) Reliability of PORV
(9) Adequacy of Control Room Instrumentation and Controls
(10) Inability to Place Startup FW Pump in Service from Control Room
(11) Resolution of Other Equipment Deficiencies
(12) Adequacy of Procedures for "Drastic" Action
(13) Adequacy of Safety System Testing

RESTART EVALUATION ITEMS (CONTINUED)

- Evaluate Licensee's Response to Additional NRC Concerns
  - Adequacy of Procedures, Equipment and Training for Restoring Equipment for LOF Mitigation
  - Adequacy of Programs to Resolve Likelihood of Inadvertent Isolation of AFW to Both Steam Generators
  - Installation of Diverse Drive AFW Pump
  - Other ESF Systems Adequacy in Light of Single Failure Vulnerabilities Identified in SFRCS and AFW Systems

25

RESTART EVALUATION ITEMS (CONTINUED)

- Evaluate Licensee's Response to Management and Programmatic Concerns
  - Adequacy of Management Practices
  - Adequacy of Maintenance Program Improvements
  - Adequacy of the Implementation of the Performance Enhancement Program
  - Adequacy of the Resources Committed to the Davis-Besse Facility for the Investigation of the Event, Resolution of Findings and Conclusions, and Longer Term Actions
- May Be Additional Restart Issues as a Results of Continuing Staff Review

OTHER NRC RESTART CONSIDERATIONS

- Organizational
  - Regional III Section Created to Monitor Davis-Besse
  - NRR Enhanced B&W Projects Group; E.G., Extra Project Managers
- ACRS Briefing in October on Davis-Besse Restart
- Determine Actions to be Completed Prior to and Subsequent to Facility Restart
- Conduct Special Inspections of Licensee's Corrective Action Programs; Inspections to Monitor and Evaluate Troubleshooting
- NRR-Region Maintenance Assessment - Prior to Restart
- NRR-Region Training Accreditation Site Review - Prior to Restart

OTHER NRC RESTART CONSIDERATIONS (CONTINUED)

- Evaluate Licensee Programs Being Implemented to Address NRC Concerns Relating to Regulatory Performance
- Evaluate Changes to Operating Procedures and Philosophy
- Inspect Special Confirmatory Testing of Systems and Equipment Involved in June 9, 1985 Event
- Conduct Augmented Inspections During Startup and Operation
- Enforcement Action Consideration

INTRODUCTION QUESTION F. DESCRIBE GENERIC IMPLICATIONS FOR OTHER PLANTS.

ANSWER TO INTRODUCTORY QUESTION F - Page 1 of 7

- Under study, but none of immediate safety significance
- Some Short Term and Long Term Actions Under Review
  - Questions concerning AFW system reliability
  - Adequacy of emergency procedures and operator training for feed and bleed cooling
  - Physical security system constraints which deny operator timely access
  - Adequacy of torque switch and torque switch bypass setting for safety related valves
  - Other actions longer term in nature are under review

INTRODUCTION QUESTION F. DESCRIBE GENERIC IMPLICATIONS FOR OTHER PLANTS.

ANSWER TO INTRODUCTORY QUESTION F - Page 1 of 7

- o Under study, but none of immediate safety significance
- o Some Short Term and Long Term Actions Under Review
    - Questions concerning AFW system reliability
    - Adequacy of emergency procedures and operator training for feed and bleed cooling
    - Physical security system constraints which deny operator timely access
    - Adequacy of torque switch and torque switch bypass setting for safety related valves
    - Other actions longer term in nature are under review

NRC GENERIC TECHNICAL ACTIONS

- Immediate Generic Issues - None
- Short Term Generic Issues
  - Potential Inability to Remove Decay Heat Because of Questionable Reliability of AFWS
  - Adequacy of Emergency Procedures, Operator Training and Available Plant Monitoring Systems for Determining Need to Initiate Feed and Bleed Cooling
  - Physical Security System Constraints which could
  - Deny Timely Access to Vital Equipment
  - Prioritization of Short Term Issues is Nearly Complete

NRC GENERIC TECHNICAL ACTIONS (CONTINUED)

- **Potential Long Term Generic Issues**

  (1) Availability and Role of STA

  (2) Actions to Improve Reliability of PORV, and Need for Failure Mitigation

  (3) Adequacy of Requirements for SPDS Availability

  (4) Need for Plant-Specific Simulator

  (5) Adequacy of Safety System Testing

  (6) Re-Evaluate NUREG-0737 Item II.E.1.1 (AFW System Reliability)

32

ANSWER TO INTRODUCTORY QUESTION F - Page 4 of 7

NRC GENERIC TECHNICAL ACTIONS (CONTINUED)

(7) Adequacy of Maintenance Requirements

(8) Adequacy of Single-Failure Aspects of Steam Line/Feed Line Break Mitigation Systems

(9) Effects of Loss of Feedwater On OTSG

(10) Thermal-Hydraulic Aspects of Loss of Feedwater Event on Reactor Vessel

(11) Re-Examine PRA-Based Estimates of Core Damage Resulting from Loss of Feedwater

— Other Additional Issues, as Identified

NRC GENERIC TECHNICAL ACTIONS (CONTINUED)

- Information Notices - Bulletins

ISSUE	ACTION
Generic Applicability of Failure of Safety-Related Valves	Bulletin Drafted and Distributed for Comment. Plan to Meet with CRGR in Early October
Guidance on Notification of Most Severe Plant Condition	Prepare Information Notices by October 15 on "Emergency Notifications" and "Timely Declaration of an Emergency Class and Implementation of an Emergency Plan"

34

NRC GENERIC TECHNICAL ACTIONS (CONTINUED)

ISSUE	ACTION
Generic Aspects of Auxiliary Feedwater Turbine Reliability	Following Confirmation of Failure Cause at Davis-Besse, Issue Information Notice or Bulletin on Generic Problems
	Possible Actions are with Respect to Startup and Post Modifications Testing. Action Planned by October 25
Generic Aspects of Equipment Malfunctions from Table 5.1 of NUREG-1154	Following Confirmation of Failure Cause at Davis-Besse, Issue Information Notice or Bulletin on Challenges to Safety Systems.

NRC GENERIC TECHNICAL ACTIONS (CONTINUED)

- Generic Long-Term Studies
  - Assess Safety-Related Motor Operated Valve Failures and Failure Modes Affecting Valve Performance Under Design Basis Conditions
  - Conduct Study of Steam-Turbine Driven Pump Performance to Determine Root Cause(s) of Overspeed Trips

ADDITIONAL WRITTEN MATERIAL

SECTION II

QUESTION 1. PROVIDE AN OVERVIEW OF KNOWN MANAGEMENT PROBLEMS AND AUXILIARY FEEDWATER DESIGN WEAKNESSES AT DAVIS-BESSE PRIOR TO THE JUNE 9TH INCIDENT.

ANSWER.

(A)--MANAGEMENT: CONCERN ABOUT DAVIS-BESSE'S MANAGEMENT PERFORMANCE WAS IDENTIFIED IN 1982, WHEN THE RESULTS OF THE 1981 SALP INSPECTION CLASSIFIED BOTH MAINTENANCE AND QUALITY ASSURANCE AS CATEGORY 3 (LOWEST). THIS WAS COMBINED WITH A RELATIVELY HIGH NUMBER OF DEFICIENCIES OBSERVED DURING NRC INSPECTIONS AND A NUMBER OF SIGNIFICANT LICENSEE EVENT REPORTS.

IN THEIR 1982 SALP ASSESSMENT, THE MAINTENANCE PROGRAM REMAINED CATEGORY 3 AND, THROUGH 1983, THE NRC OBSERVED CONTINUED WIDE-SPREAD DEFICIENCIES IN MANAGERIAL OVERSIGHT.

ANSWER TO QUESTION 1 - Page 2 of 4

In 1984, as a result of several special inspections, a $90,000 civil penalty was imposed on Toledo Edison for deficiencies in management controls. Their 1983-84 SALP identified five Category 3 areas including maintenance, fire protection, emergency preparedness, quality programs and administrative controls, and training. Starting in early 1985, due principally to Toledo Edison's performance improvement program and to changes in executive management, there were notable improvements in management control, although Davis-Besse still remained below average compared to other Region III reactors.

(b)--Auxiliary Feedwater System: The Davis-Besse auxiliary feedwater system was originally designed to be a safety-grade system with two steam-driven turbine AFW pumps. The term safety-grade means that the equipment should be procured, tested, and installed in accordance with Appendix B 10 CFR Part 50; met the single-failure criterion, and was seismically and environmentally qualified in accordance with the standards in

PLACE AT THE TIME OF LICENSING. THE STAFF'S STANDARD REVIEW PLAN (SRP) PUBLISHED IN 1975 STATED THE STANDARDS FOR LICENSING FUTURE NUCLEAR POWER PLANTS. AT THAT TIME IT WAS DECIDED THAT THE SRP WOULD NOT BE RETROFITTED TO NEARLY COMPLETED PLANTS UNLESS THERE WAS AN OVERRIDING SAFETY REASON TO DO SO. THIS DECISION RECOGNIZED THE INEQUITY OF MAKING MAJOR CHANGES IN REQUIREMENTS FOR PLANTS ALREADY DESIGNED AND, IN LARGE MEASURE, CONSTRUCTED.

PART 10.4.9 OF THE SRP INCLUDED, AMONG OTHERS, THESE NEW REQUIREMENTS FOR AUXILIARY FEEDWATER SYSTEMS. THESE DIFFERED IN TWO MAJOR RESPECTS FROM THE REQUIREMENTS UNDER WHICH DAVIS-BESSE WAS LICENSED. FIRST, THE SRP PROVIDED A SYSTEM RELIABILITY GOAL OF 10^{-5} TO 10^{-4}. SECOND, THE SRP REQUIRED DIVERSE MOTIVE AND CONTROL POWER FOR A MINIMUM OF TWO AFW PUMPS. DAVIS-BESSE WOULD NOT HAVE MET EITHER OF THESE REQUIREMENTS, HAD THEY BEEN REQUIRED.

ANSWER TO QUESTION 1 - Page 4 of 4

AFTER THE ACCIDENT AT TMI-2, THE STAFF IDENTIFIED AFW RELIABILITY AS A MAJOR CONTRIBUTOR TO THE ACCIDENT AND, THEREFORE, REQUIRED SIGNIFICANT UPGRADES IN AFW SYSTEMS AND ALSO REQUIRED A DETAILED RELIABILITY ANALYSIS OF B&W AFW SYSTEMS. AS A RESULT OF THESE REQUIREMENTS, DAVIS-BESSE MADE A SIGNIFICANT NUMBER OF CHANGES TO ITS AFW SYSTEM. THESE INCLUDED CHANGING CONTROL POWER ON ONE TRAIN FROM AC TO DC, REMOVING SOME INTERLOCKS THAT REDUCED RELIABILITY, UPGRADING INITIATION CIRCUITS TO SAFETY-GRADE, AND UPGRADING SOME MECHANICAL COMPONENTS.

QUESTION 2. DESCRIBE NRC'S AWARENESS OF THESE ISSUES AND ANY CORRECTIVE ACTIONS TAKEN PRIOR TO JUNE 9TH.

ANSWER.

(A)--MANAGEMENT: AS NOTED IN QUESTION 1 ABOVE, THE NRC HAD IDENTIFIED THE DEGRADATION IN MANAGEMENT CONTROL AT DAVIS-BESSE AS EARLY AS 1982 AND HAD IN 1983 INCREASED ITS OVERSIGHT ACTIVITIES TO MONITOR DAVIS-BESSE'S ATTEMPTS TO IMPROVE ITS PERFORMANCE. AS A RESULT OF A NOVEMBER 1983 NRC MEETING WITH TOLEDO EDISON'S PRESIDENT, THE LICENSEE INITIATED A PERFORMANCE ENHANCEMENT PROGRAM WHICH WAS DESIGNED TO UPGRADE MANAGEMENT PERFORMANCE. AT THIS TIME THE STAFF ASSIGNED A SECOND RESIDENT INSPECTOR TO DAVIS-BESSE AND STARTED A SERIES OF MONTHLY MEETINGS WITH THE LICENSEE TO MONITOR PROGRESS IN THE PERFORMANCE ENHANCEMENT PROGRAM. ADDITIONAL INSPECTION ACTIVITIES WERE SCHEDULED TO MONITOR PROGRESS IN QA AND MANAGEMENT PERFORMANCE, AND ADDITIONAL MEETINGS BETWEEN UTILITY

AND NRC MANAGEMENT WERE HELD PERIODICALLY THROUGHOUT 1984 AND EARLY 1985. AS A RESULT OF THE NRC'S CONTINUING INSPECTION ACTIVITIES, TWO MAJOR CIVIL PENALTIES WERE ASSESSED AGAINST DAVIS-BESSE FOR DEFICIENCIES IN MANAGEMENT CONTROL, AND CONFIRMATORY ACTION LETTERS WERE ISSUED BY THE STAFF TO REQUIRE CORRECTION OF IDENTIFIED DEFICIENCIES.

(B)--AUXILIARY FEEDWATER SYSTEM: AS DISCUSSED IN THE ANSWER TO QUESTION 1 ABOVE, THE TMI ACTION PLAN RESULTED IN A COMPREHENSIVE REVIEW OF THE RELIABILITY OF THE DAVIS-BESSE AUXILIARY FEEDWATER SYSTEM AND A NUMBER OF IMPROVEMENTS WERE MADE TO THE SYSTEM. NONETHELESS, PRINCIPALLY BECAUSE THERE WERE ONLY TWO PUMPS AND THEY WERE BOTH STEAM-DRIVEN, THE SYSTEM STILL HAD A PROBABILISTIC RELIABILITY LOWER THAN THAT CONSIDERED DESIRABLE FOR THE REST OF PLANT LIFE. THE SOLUTION PROPOSED BY THE STAFF WAS THE ADDITION OF A THIRD PUMP, THIS ONE ELECTRICALLY-DRIVEN. AS THIS ADDITION INVOLVED SIGNIFICANT AND EXPENSIVE MODIFICATIONS TO THE AFW SYSTEM, THE LICENSEE

ANSWER TO QUESTION 2 - Page 3 of 3

PROPOSED UPGRADES IN PROCEDURES AND CONTROL SYSTEMS THAT WOULD ALLOW THE USE OF THE INSTALLED, HALF-SIZE, ELECTRICALLY-DRIVEN STARTUP PUMP RATHER THAN THE INSTALLATION OF A THIRD PUMP. SINCE THE RELIABILITY OF THE AFW SYSTEM AS THEN CONFIGURED WAS NOT SO LOW AS TO PRESENT AN IMMEDIATE HAZARD, THE STAFF ALLOWED THE LICENSEE ADDITIONAL TIME TO DEVELOP ANALYSES TO SUPPORT THIS ALTERNATIVE. IN 1984, AFTER FURTHER DISCUSSION, THE LICENSEE AGREED TO INSTALL THE THIRD PUMP DURING THE NEXT REFUELING OUTAGE, THEN SCHEDULED FOR LATE 1985.

QUESTION 3. PROVIDE A LISTING OF EACH FAILURE THAT OCCURRED DURING THE JUNE 9TH INCIDENT SPECIFYING THE CAUSE AND THE ESTIMATED PROBABILITY OF THE FAILURE BASED ON NRC PROBABILISTIC RISK ANALYSES AND PRECURSOR DATA.

ANSWER.

A LIST OF THE SPECIFIC FAILURES AND THEIR CAUSES IS PROVIDED IN THE ATTACHED DOCUMENT. HOWEVER, IT IS NOT POSSIBLE TO DEVELOP SPECIFIC PRECURSOR DATA FOR EACH FAILURE. FAILURE DATA--FOR EXAMPLE, DATA ON AUXILIARY FEEDWATER RELIABILITY--IS NORMALLY COLLECTED ON A SYSTEM OR LARGE SUBSYSTEM BASIS AND THUS IT IS NOT POSSIBLE TO DISAGGREGATE THE DATA AND IDENTIFY PROBABILITIES FOR SPECIFIC COMPONENTS FAILING IN SPECIFIC MODES. IN SOME CASES, DATA IS AVAILABLE FOR THE GENERAL FAILURE PROBABILITY OF EITHER A TURBINE-DRIVEN OR AN ELECTRIC-DRIVEN PUMP. HOWEVER, THE DATA BASE IS NEITHER SUFFICIENTLY EXTENSIVE NOR REFINED TO PREDICT THE EXACT FAILURE THAT OCCURRED AT DAVIS-BESSE, I.E., OVERSPEED DUE TO GOVERNOR MALFUNCTION. ALSO, WHERE DATA ON A TURBINE-DRIVEN PUMP IS GIVEN, IT REPRESENTS THE AVERAGE RELIABILITY OF ALL TURBINE-DRIVEN PUMPS, NOT THAT OF THE SPECIFIC DAVIS-BESSE MODEL. THEREFORE, OUR DATA BASE CANNOT PROVIDE THE INFORMATION YOU REQUESTED.

ATTACHMENT:
AS STATED

LIST OF FAILURES AND CAUSES.
RELATED TO
DAVIS-BESSE JUNE 9, 1985 EVENT

SUMMARY OF EQUIPMENT TROUBLESHOOTING RESULTS

	ITEM	NATURE OF FAILURE	PROBABLE ROOT CAUSE
1.	Main Feedwater Turbine	Overspeed	Control System Electronic Circuit Card Failure
2.	Closure of MSIVs	Spurious Actuation of SFRCS	Pressure oscillations caused by turbine stop valve closure resulted in momentary SFRCS trips
3.	Steam Safeties, Atmos. Vents	Abnormal Pressure	Investigations continuing but presently considered due to normal system response
4.	Aux. Feedwater Turbines	Overspeed	Condensate Flow to Turbines From Steam Supply Lines During Turbine Start
5.	AFW Containment Isolation Valves	Would Not Re-Open	Improper Settings for Torque. Switch Bypass Contacts
6.	Steam Supply Valve to AFPT #1	Short Cycle	Investigations Continuing but appears to be improper settings of torque switch bypass
7.	Source Range NI	Failed, Low	Investigations continuing
8.	PORV	Did Not Close	Disassembly of Valve and testing of Control system Failed to Reveal Cause
9.	S/U Feedwater Control Valve	Did Not "Reset"	Indication Problem Only - Indicator Lamp
10.	Recovery of AFP Turbine	Trip-Throttle Valve Operational Diffi-culties	Lack of Operator Training
11.	AFP #1 Suction Transfer	Transfer to Service Water	Strainers installed in suction caused less than intended suction pressure under transient flow conditions
12.	Turbine Bypass Valve	Fractured	Water Hammer, Valve Mis-Assembly

Question 4. Provide an estimate of the probability of the combination of failures that occurred during the June 9th incident based on NRC probabilistic risk analyses and precursor data.

Answer.

For the reasons discussed above, the statistical data base does not provide data of the requisite specificity or level of detail necessary to predict, in a meaningful way, the probability of the specific event that occurred at Davis-Besse. Further, even if such data existed, neither it nor PRA, as it is generally used in the nuclear industry, would take into account human failures. Reliability analyses assume that equipment is installed, maintained, tested, and operated in such a way that the reliability of the system would be as designed. This was not true at Davis-Besse, where many of the specific component failures can be traced to a human failure in one of the above areas.

Generally speaking, the generic calculations for B&W feedwater systems done by the staff and by licensees suggest a probability of a sustained failure of main and auxiliary feedwater in the range of 10^{-3} to 10^{-4} per year. It should be noted that the calculated value for a system such as that at Davis-Besse would have been slightly lower, as Davis-Besse also

HAD A HALF-SIZE, START-UP FEEDWATER PUMP. THIS PUMP, WERE IT OPERATING ALONE, WOULD NOT HAVE BEEN SUFFICIENT TO PREVENT OVERHEATING OF THE CORE; YET IT WOULD HAVE BEEN SUFFICIENT TO DELAY THE ONSET OF OVERHEATING FOR SOME SIGNIFICANT PERIOD, THUS INCREASING THE PROBABILITY OF REGAINING OPERATION OF ONE OF THE FULL-SIZE AFW PUMPS.

ALSO, THE ABOVE ESTIMATE DOES NOT REFLECT THE ABILITY OF THE DAVIS-BESSE PLANT TO COOL THE CORE USING FEED-AND-BLEED. ALTHOUGH THE FEED-AND-BLEED CAPABILITY NATURALLY DOES NOT REDUCE THE PROBABILITY OF LOSS OF FEEDWATER, IT SUBSTANTIALLY DECREASES THE PROBABILITY OF CORE DAMAGE RESULTING FROM SUCH A LOSS. THE STAFF ESTIMATES THAT THE PROBABILITY OF SIGNIFICANT CORE DAMAGE RESULTING FROM A LOSS OF FEEDWATER TRANSIENT AT A PLANT LIKE DAVIS-BESSE, I.E., ONE WITH TWO AFW PUMPS AND FEED-AND-BLEED CAPABILITY, WOULD BE BETWEEN 10^{-4} AND 10^{-5} PER REACTOR-YEAR.

QUESTION 5. GIVE AN EXPLANATION OF HOW THE ISSUE OF THE THIRD AUXILIARY FEEDWATER PUMP WOULD HAVE BEEN TREATED UNDER THE NEW BACKFIT RULE.

ANSWER.

UNDER THE NEW 10 CFR 50.109, A PROPOSED REQUIREMENT TO ADD A THIRD PUMP AFTER THE DATE OF ISSUANCE OF AN OPERATING LICENSE FOR THE FACILITY WOULD QUALIFY AS A PROPOSED BACKFIT, IF SUCH A PROPOSED REQUIREMENT WAS NOT A CONDITION OF THE LICENSE OR ALREADY COMMITTED TO BY THE LICENSEE. THE NEW 10 CFR 50.109 CLEARLY STATES THAT THE COMMISSION SHALL REQUIRE A SYSTEMATIC AND DOCUMENTED ANALYSIS FOR BACKFITS WHICH IT SEEKS TO IMPOSE. THE ANALYSIS MUST BE DONE TO PROVIDE INFORMATION WHICH WOULD ASSIST IN THE DETERMINATION OF WHETHER OR NOT THE ADDITION OF THE THIRD PUMP WOULD PROVIDE A SUBSTANTIAL INCREASE IN THE OVERALL PROTECTION OF THE PUBLIC HEALTH AND SAFETY AND THAT THE DIRECT AND INDIRECT COSTS OF IMPLEMENTATION FOR THAT FACILITY ARE JUSTIFIED IN VIEW OF THE INCREASED PROTECTION.

THE STAFF ANALYSIS, IF APPROVED BY THE OFFICE DIRECTOR OF THE IMPOSING OFFICE, WOULD BE TRANSMITTED WITH THE PROPOSED BACKFIT TO THE LICENSEE. AT THIS POINT, THE LICENSEE COULD IMPLEMENT THE STAFF PROPOSAL OR APPEAL IT. AFTER AT MOST A TWO-STEP APPEAL PROCESS, A DECISION WOULD BE MADE BY THE OFFICE DIRECTOR. IF THE DECISION WAS THAT THE STAFF PROPOSAL SHOULD

BE IMPOSED, EITHER THE LICENSEE WOULD IMPLEMENT THE REQUIREMENT VOLUNTARILY OR THE OFFICE DIRECTOR WOULD ISSUE AN ORDER EFFECTING THE REQUIREMENT.

THE JULY 6, 1979 ORDER TO THE LICENSEE FOLLOWING THE TMI-2 ACCIDENT STATED THAT WE WILL REQUIRE THAT THE LICENSEE MODIFY THE PLANT TO PROVIDE THE GREATER DIVERSITY OFFERED BY A 100% CAPACITY MOTOR-OPERATED AFW PUMP OR AN ALTERNATIVE ACCEPTABLE TO THE STAFF. THEREFORE, BACKFIT WOULD NOT APPLY TO A THIRD AFW PUMP REQUIREMENT IN THE ABSENCE OF AN ACCEPTABLE ALTERNATIVE BECAUSE THIS REQUIREMENT PRECEDED THE EFFECTIVE DATE OF THE NEW BACKFIT RULE.

HOWEVER, THE BACKFIT ISSUE IS MOOT BECAUSE THE LICENSEE HAS ELECTED AND IS IN FACT IN THE PROCESS OF INSTALLING THE ADDITIONAL PUMP TO FULFILL AN EXISTING LICENSE CONDITION.

QUESTION 6.. PROVIDE A DETAILED DEFINITION OF THE TERM "SUBSTANTIAL INCREASE IN OVERALL PROTECTION" IN THE BACKFIT RULE, AND A COMPLETE EXPLANATION OF THE METHODOLOGY AND CRITERIA THAT THE NRC WILL USE TO DETERMINE IF THIS STANDARD IS MET.

ANSWER.

THE COMMISSION'S STATEMENT ACCOMPANYING THE FINAL BACKFIT RULE PROVIDES THE DEFINITION. IT FOLLOWS:

> THE STANDARD AGAINST WHICH PROPOSED BACKFITS WOULD BE MEASURED IS STATED IN §50.109(A)(3) AS "SUBSTANTIAL INCREASE IN THE OVERALL PROTECTION OF THE PUBLIC HEALTH AND SAFETY OR THE COMMON DEFENSE AND SECURITY." SUBSTANTIAL MEANS "IMPORTANT OR SIGNIFICANT IN A LARGE AMOUNT, EXTENT, OR DEGREE." UNDER SUCH A STANDARD, THE COMMISSION WOULD NOT ORDINARILY EXPECT THAT SAFETY IMPROVEMENTS WOULD BE REQUIRED AS BACKFITS WHICH RESULT IN AN INSIGNIFICANT OR SMALL BENEFIT TO PUBLIC HEALTH AND SAFETY OR THE COMMON DEFENSE AND SECURITY, REGARDLESS OF THE IMPLEMENTATION COSTS. ON THE OTHER HAND, THE STANDARD IS NOT INTENDED TO BE INTERPRETED IN A MANNER THAT WOULD RESULT IN DISAPPROVALS OF WORTHWHILE SAFETY OR SECURITY IMPROVEMENTS HAVING COSTS THAT ARE JUSTIFIED IN VIEW OF THE INCREASED PROTECTION THAT WOULD BE PROVIDED.

THE PHRASE "OVERALL PROTECTION OF THE PUBLIC HEALTH AND SAFETY OR THE COMMON DEFENSE AND SECURITY" IN THE PROPOSED BACKFIT STANDARD ALSO DESERVES SOME DISCUSSION. THE PRINCIPAL PURPOSE OF REQUIRING CONSIDERATION OF THE OVERALL PROTECTION THAT WOULD BE PROVIDED BY A PROPOSED BACKFIT IS TO ENSURE THAT BOTH ITS NEGATIVE AND POSITIVE EFFECTS ARE TAKEN INTO ACCOUNT IN DECIDING WHETHER THE BACKFIT IS JUSTIFIED. A BACKFIT FOR A PART OF A PLANT SHOULD BE EVALUATED IN LIGHT OF THE NET INCREASE IN OVERALL PROTECTION THAT THE ENTIRE PLANT WOULD PROVIDE AS A RESULT OF THE BACKFIT, TAKING INTO ACCOUNT THE EFFECTS IT WOULD HAVE ON OTHER ASPECTS OF THE PLANT. THUS, THE NET BENEFIT OF A BACKFIT TO THE PROTECTION PROVIDED BY THE PLANT AS A WHOLE IS THE OVERRIDING CONSIDERATION, NOT JUST THE BENEFIT TO THE PART OF THE PLANT BEING BACKFITTED.

HOWEVER, THE COMMISSION DOES NOT INTEND USE OF THE PHRASE "OVERALL PROTECTION" IN THE BACKFIT STANDARD TO SIGNAL A DEPARTURE FROM ITS TRADITIONAL RELIANCE ON DEFENSE IN DEPTH AND DIVERSITY FOR PROTECTION OF PUBLIC HEALTH AND SAFETY. THEREFORE, SAFETY IMPROVEMENTS IN ONE LINE OF DEFENSE AGAINST UNDUE RISK SHOULD NOT BE DISAPPROVED OR APPROVED BASED SOLELY ON THE PRESENCE OR ABSENCE OF ANOTHER LINE OF DEFENSE TO COPE WITH THE FAILURE OF THE FIRST. FOR EXAMPLE, SAFETY IMPROVEMENTS IN THE INTEGRITY OF THE REACTOR COOLANT SYSTEM SHOULD NOT BE DISMISSED

> MERELY BECAUSE AN EMERGENCY CORE COOLING SYSTEM HAS BEEN PROVIDED TO PROTECT PUBLIC HEALTH AND SAFETY WITH HIGH CONFIDENCE IN THE EVENT THAT THE INTEGRITY OF THE REACTOR COOLANT SYSTEM IS LOST. ON THE OTHER HAND, SUCH A SUGGESTED IMPROVEMENT MAY BE PRECLUDED BECAUSE IT DOES NOT MEET THE SUBSTANTIAL TEST, OR DOES NOT INCREASE OVERALL PROTECTION PROVIDED BY THE PLANT DUE TO, FOR EXAMPLE, THE NEGATIVE IMPACTS ON OTHER ASPECTS OF THE PLANT.

THERE ARE CURRENTLY NO SPECIFIED METHODS OR CRITERIA FOR SYSTEMATICALLY AND QUANTITATIVELY SPECIFYING A THRESHOLD VALUE FOR "SUBSTANTIAL." NRC EFFORT TO ESTABLISH SAFETY GOALS MAY OR MAY NOT YIELD USEFUL MEASURES THAT WOULD PROVIDE FOR ESTABLISHING A THRESHOLD VALUE FOR A SUBSTANTIAL INCREASE IN PROTECTION."

Mr. Markey. Does any other member of the panel wish to make an opening statement before we go to questions?

STATEMENT OF JAMES K. ASSELSTINE

Mr. Asselstine. Yes, I have a few comments.

Mr. Markey. Commissioner Asselstine, you are recognized.

Mr. Asselstine. As far as the Davis-Besse plant is concerned, our staff has now completed a detailed review of the June 9 event at the plant. That review identifies the specific errors and equipment failures which occurred during the June 9 event, and where possible attempts to reach a conclusion on the root cause of the error or the failure.

The licensee has developed an extensive program for correcting flux those problems, and our staff is in the process of reviewing the adequacy of this corrective program.

While we do not yet have a detailed plan from our staff which describes all of the steps needed to verify the adequacy of the utility's corrective program and the satisfactory condition of the plant, efforts are well underway in that area.

I am also heartened by the fact that a majority of the Commission now seems to favor a formal review by the Commissioners themselves of the adequacy of the licensee's and staff's corrective programs for the Davis-Besse plant before that plant will be allowed to restart.

I think it is also fair to say that considerable changes are occurring at the Davis-Besse plant. A new management team is in place at the plant, which includes a new senior vice president, nuclear, a new plant manager and new supervisors in a number of key operational areas, including maintenance.

The licensee is undertaking extensive testing and repair work on the safety systems of the plant, and key areas such as maintenance, spare parts, training and operations are getting the attention that has been needed for too long.

While much still needs to be done to verify the adequacy of the plant and the performance of the licensee's staff to give us the necessary assurance that this plant can operate safely, my own concerns now go as much to two generic issues which arise out of the June 9 event at Davis-Besse. Both of these generic concerns go to the effectiveness of our own regulatory program.

My first concern has to do with the NRC's evaluation of the reliability of the Davis-Besse auxiliary feedwater system and the generic implications for NRC decisions regarding reliability of safety systems at other plants.

I think it is clear that the licensees and NRC's own estimates of the reliability of the Davis-Besse auxiliary feedwater system were overly optimistic, largely because the approach taken in doing these reliability analyses failed to consider the serious weaknesses at the plant in operations, maintenance and testing.

It is also clear that the wrangling between the staff and the licensee over whether to backfit the Davis-Besse auxiliary feedwater system to bring about real improvements went on for far too long.

As our staff has noted, this aspect of the Davis-Besse event highlights a serious problem in using probabilistic risk assessments and cost/benefit analyses, and has generic implications for NRC's backfitting practices.

My second concern has to do with the effectiveness of NRC's inspection and enforcement program in identifying the potential safety impact of marginal operations performance and bringing about prompt corrective action in cases in which sustained marginal performance has been identified.

It is clear that we were aware of significant problems with this licensee's performance literally for years. But it is also clear that our inspection and enforcement program failed to identify the potential for the kind of extensive equipment failures which occurred at Davis-Besse on June 9. And, despite good efforts by many members of our regional staff, our program failed to bring about timely and effective change in the licensee's organization.

Despite negative evaluations, fines and numerous meetings with licensee management, real improvement was not achieved in time. In essence, our program became more of an effort to continually validate our concerns about the licensee's performance than a vehicle for assuring prompt and effective change. The potential impact of these two weaknesses in our regulatory program is far-reaching and extends to many plants other than Davis-Besse.

I think the key question is how much progress has been made in addressing these two generic concerns about the adequacy of our regulatory program in the 3 months since the June 9 Davis-Besse event. The answer to that question, in my view, is not much and what has been done at least on the first question, goes in the wrong direction. The Commission has consistently refused to institute an independent review within the agency of the problem with NRC's performance in each of these areas, the reasons for the problems and necessary corrective measures. Instead, our review of the adequacy of the NRC's performance in these two areas has been left to the NRC staff members who had the responsibility for Davis-Besse. To date, those reviews have produced a total of 3½ pages of written analysis and a few broad descriptions of some planned efforts by the NRC staff.

Moreover, in the case of the concern regarding the adequacy of past NRC backfitting procedures, the Commission has proceeded to codify the very backfitting practices—heavy reliance on reliability and probabilistic and cost/benefit analyses—that were called into question by the Davis-Besse event.

By adopting its backfitting rule, and by applying it to every proposed change to a plant, including individual plant hardware and operational changes, generic changes, new safety regulations and even backfitting decisions made by the Commission itself, the Commission has helped ensure the problems experienced in upgrading reliability of the auxiliary feedwater system at Davis-Besse will not be isolated occurences. Instead, we are now more likely to repeat those mistakes in the future for other beneficial safety improvements at this and other plants.

As for improvements in our inspection and enforcement program, our staff outlined in very general terms to the Commission yesterday their plans for new regulatory initiatives in the areas of plant management, operations, maintenance and testing. Some of these ideas were reflected in a new inspection approach used at the

Turkey Point plant, which identified significant maintenance weaknesses at that plant. These plans are sure to generate opposition within the industry, which has strongly opposed any effort by the NRC to impose new regulatory requirements in the operational area. Thus far, the Commission has tended to support the industry's approach of self-regulation in operational areas. I think it is clear that that voluntary approach has failed at Davis-Besse, and at TVA and some other of our licensees. As the shock effect of the Davis-Besse event wears off and as the industry opposition mounts, it will be particularly important for the Commission and the Congress to support these efforts. If the Commission fails to address these two generic concerns about the adequacy of our regulatory program, then I think we are in for more events of the type which occurred at Davis-Besse on June 9 or worse. The time to learn from our past mistakes is now if the Commission is to become part of the solution rather than part of the problem.

Thank you.

Mr. MARKEY. The gentleman's time has expired.

Any other members of the subcommittee that wish to make opening statements?

Fine.

Any other members of the panel?

STATEMENT OF LANDO W. ZECH

Mr. ZECH. Yes.

Mr. MARKEY. Fine. Commissioner Zech.

Mr. ZECH. I don't have a written statement, Mr. Chairman, but with your permission I would like to respond to several of the points that you raised in your opening statement.

Mr. MARKEY. Fine.

Mr. ZECH. First of all, the incident at Davis-Besse is considered by the Commission as a serious incident and one that we are looking into very carefully. I think it should be recognized, however, and put into perspective, that there was no abnormal release of radioactivity and there was no plant damage.

In your written statement which you have furnished us, you talk about closely guarded secrets of the NRC and Toledo Edison. I take issue with that, Mr. Chairman.

I don't think there are closely guarded secrets at all. Most of our meetings since I have been a Commissioner involving Davis-Besse, certainly those since the first of the year, have been in public session and it is my understanding that the knowledge, our concern for this plant has been certainly in the public domain.

You mentioned also in your written statement about benign neglect. I can assure you, Mr. Chairman, there is no benign neglect on the part of our Commission or agency for the public health and safety.

We care about public health and safety. We are not perfect, Mr. Chairman. We are human. We are doing the very best we can, but we deeply care about our responsibilities.

You talk also about the view that you feel that the Commissioners just want to make Davis-Besse operational as soon as possible and that we are ignoring our responsibilities for assuring public health and safety.

Mr. Chairman, I take issue with that. We care about our responsibilities for public health and safety and we are not going to let that plant operate until we are sure in our own mind and with the best analysis and advice from all the experts that we can muster that the plant does have reasonable assurance of public health and safety.

Just a quick word on backfitting. In my view, the backfitting policy is meant to provide a focus and a prioritizing and to raise the level of modifications to plants to our senior staff level and I don't know that it would have made a considerable difference in this case at all, but I do think it perhaps would have brought more focus and more prority to a problem such as the Davis-Besse.

I think the backfitting rule is appropriate. It raises the degree of senior staff level focus on these modifications. I hope, and I certainly believe, that it could have and should have benefits to improve safety of our nuclear plants.

You talked about I think it was voodoo regulations. Mr. Chairman, you may think they are voodoo regulations. I do not. I think our regulations are carefully thought out and are responsible regulations.

Mr. Moorhead and Ms. Kaptur mentioned in their statements that they are hoping we get some positive constructive lessons learned from this event. I agree with that.

I want positive and constructive lessons to come from this event. We should learn from it. There were mistakes made, obviously.

We want to improve and that is a positive way that I look at it also. Mr. Moorhead talked about the operators. The operators at Davis-Besse did a very, very fine job.

They did an excellent job and they should be commended for what they did. There were problems with the plant, but the operators handled them extremely well. They made mistakes, too. They were not perfect, but the operators deserve great credit for their contribution to public health and safety.

Mr. Moorhead mentioned standardized plants. He is absolutely right. One of the difficulties we have in regulating this industry is we have 55 different utilities. The plants are all different.

We have a number of vendors, a number of architect engineers, a number of contractors involved. Our plants are custom-made plants. It is a very difficult situation to regulate.

We have to regulate in a sense with custom-made regulations. If we had standardized plants in my view, we would be able to discipline our plants, we would be better trained because training would be uniform, we would have operations that are uniform, have maintenance that would be more uniform and we would have management even more uniform and certainly our regulations could be more uniform.

We could focus our attention on the more important issues rather than try to regulate so many custom-made plants. I think that standardization is an important step, standardization for the future we are talking about, of course.

The most important thing we have to do right now in this agency in my opinion is to make sure to the best of our ability that our operating plants operate safely—Davis-Besse and all the others.

That is our primary concern, make operating plants operate safely.

The secondary concern in my concern is to bring on the plants that are under construction in a quality way and then operate them safely.

The third priority that I have is for the future and that is for standardization. We must simply standardize.

In summary, I think Davis-Besse was being carefully monitored by our staff. In hindsight it would have been valuable if we could have had the wisdom to predict the problem.

I think, however, we should learn the lessons from Davis-Besse and I can assure you that all of us on this Commission and our staff which is sometimes maligned by those who in my view don't give it the credit due. We have a number of technically competent, dedicated Americans serving on this Commission and our staff, I know, was doing their very best for public health and safety.

So let me just say that I think we should learn from Davis-Besse, but I can assure you, Mr. Chairman, that we care about our responsibilities and we fully intend to carry them out to the very best of our ability.

Thank you, Mr. Chairman.

Mr. Markey. Thank you, Commissioner.

Any other comments from the panel before we go to questioning?

Mr. Palladino. I would support Commissioner Zech's statement and I am sure others would, also.

Mr. Markey. Thank you. That will be noted in the record.

Rather than commenting upon any of the opening statements, I think that we will go right to questions and I think that way we will be able to flush out some of the areas of controversy and some of the differences of opinion that exist upon the handling of this issue.

I think that might be the most helpful way we could explore these areas of disagreement. Let me begin by asking the Commission this question. If the issue of the third pump at Davis-Besse was subjected to the Commission's new backfit rule would it have been required?

Mr. Palladino. Well, Mr. Chairman, I will attempt to answer that question. Of course, we are looking backwards but I believe it would have been identified as a backfit. We would have called for the analyses and I think we would have concluded that this was an item that should be backfitted. Because, you will recall, in our backfitting rule we make particular mention of the fact that this phrase overall protection in the backfit standard is not intended to signal any departure from our defense in-depth philosophy or our diversity philosophy.

And this would have been a matter of diversity that I think would have been recognized as very important by the Commission.

Mr. Markey. Do all of the Commissioners agree that under the existing law under the backfit policy they would have installed this third—Commissioner Asselstine, do you agree with that?

Mr. Asselstine. No, Mr. Chairman, I don't.

I think the backfit rule makes it even worse. Let's look at what happened on the consideration by the staff of the third pump. The utility came in and argued that they didn't need to make that kind of a change because they argued this system already had a high degree of reliability.

They pointed to probabilistic studies that showed or tended to show that this system had a high degree of reliability. Now, as the staffs has pointed out, since Davis-Besse, one of the flaws in those kinds of studies is they assume everything will work right. They assume that people don't make mistakes and they assume that the equipment is properly maintained and tested so that it will be in functioning condition if you need it.

As the June 9th event showed very clearly, those assumptions were just way out of line for Davis-Besse and maybe out of line for other plants as well. So the flaw in using this approach to looking at backfitting, the use or reliance on these probabilistic studies and reliability studies is you don't take into account the very great potential for human error and for substandard or marginal performance in the areas of maintenance and testing and operations.

If you don't take those things into account, then you don't get a fair evaluation of whether you need to impose a change. What the Commission's backfit rule does, without adequately addressing the serious questions that the Davis-Besse events raises about our approach to backfitting, is simply say now you have to use this in every case and put it in our regulation, to bind not only our staff but also the Commission itself.

I think it is worth noting that our staff did not support the adoption of this rule—that our chief safety officer said the rule was not necessary. I think this is a serious drawback in the regulation.

I think the rule makes it even worse than the situation was before. I totally disagree with the Chairman that the rule would have made this more likely that the third pump would have been required.

Mr. **Palladino**. Well, Mr. Chairman, I am quite sure that third pump would have been required.

Mr. **Markey**. You are quite sure it would have been required.

Mr. **Palladino**. Yes, indeed. Because the staff, did after going through the analysis, did order it and it is the same staff that would be making the cost/benefit analysis today.

Mr. **Markey**. So the plant needed three pumps. It only had two pumps and so the debate.

Mr. **Palladino**. Not for what happened at Davis-Besse, but for other events.

Mr. **Markey**. The issue is whether or not you can go back and look at these issues now under the new retrofit rule and address problems with serious consequences.

Mr. **Palladino**. It is important to me we not violate our defense in-depth diversity and this has played an important role in the nuclear industry today.

Mr. **Markey**. It is not helpful to the subcommittee to have disagreement on the Commission as to whether or not in fact the rule that you have in place in fact does require these kinds of safety features to be put in retroactively.

Mr. Dircks, who is here, the Executive Director for Operations, on September 5, 1985, an internal NRC memo from Mr. Dircks to the Commission states the NRC use of cost/benefit and risk analysis would probably not support requiring installation of a third pump at Davis-Besse.

Mr. Dircks, do you agree with Mr. Palladino or Mr. Asselstine?

Mr. DIRCKS. Do I get my own answer, Mr. Markey?

Mr. MARKEY. I am sorry, Mr. Dircks.

Mr. DIRCKS. It depends on an interpretation of the rule. I may be getting in a little bit of a jam in the middle here, but I have said before, before the Commission, I look upon the backfit rule more as a procedural requirement than a make or break requirement. I look on it more as we do with the National Environmental Policy Act analysis. It is a measure to force some thinking as to the need for a certain backfit.

I think it is reasonable to ask any member of the staff to put down why he wants a particular item backfitted. I think it is reasonable to ask the staff to give some alternatives to that backfit. I think it is reasonable to ask the staff to give some estimate of the cost of that backfit.

I think where we get in trouble, Mr. Chairman, is when we go into too much of a finetuning of cost/benefit analysis. I said that to the Commission previously.

Now, how you administer the thing is important. My view of administering the backfit rule is I think we could live with it as I have just described, as a procedural item, and not put all of our weight on cost/benefit analysis.

Mr. MARKEY. Here is the problem, Mr. Dircks. In response to a prehearing question that we sent to the Commission, they stated that it lacks procedures or criteria for determining whether the standards require a backfit is met.

So we have a serious problem. You say this is more of a procedure. We find out there is no procedure. We see the disagreement on the Commission as to whether or not in fact this third pump should have been installed and we sit up here wondering whether, in fact, there is any guarantee to the public, to the public people who live in Toledo or anywhere in the country that there is a kind of coordinated procedure and then implementation plan adequate to guarantee that the public health and safety is protected.

Commissioner Asselstine.

Mr. ASSELSTINE. The problem is the backfit rule does more than what Mr. Dircks just described. What the Commission had done in terms of providing informal directions to the staff—not a regulation—was what Mr. Dircks described. What we had said earlier to our staff was in the case of any backfit we want you to write down what the proposed change is, we want you to write down why you think it is necessary and we want you to do an estimate of what you think it will cost and what the benefits are.

What this backfit rule does is go far beyond that. This backfit rule first sets a threshold that the staff must overcome before a backfit can be imposed. That is an actual standard.

That is not just a procedure that says you have to describe these things. You have to overcome this threshold. In my view, that threshold is very high and serves as a barrier to adopting safety improvements. I think what we are going to find now that we have adopted this rule, or now that the Commission has adopted this rule is that the industry is going to insist that that threshold be met and anytime when they don't think that it is met, they are going to challenge what the Commission tries to do.

Now, what Mr. Dircks seems to be saying is we ought to just ignore that and do what we have done in the past. Where we think there is a beneficial improvement, go ahead with it. But I think that that is going to be subject to challenge and I think we are going to find that we are going to be far less able to impose new safety requirements that will result in improvements than we have been able to do in the past.

Mr. MARKEY. My time has expired. I would just like to say the reason this is so important is that this Davis-Besse accident and the system at the plant, the defects that have been identified are really the worst single incident since Three Mile Island in terms of its likelihood of leading to a core melt down.

Now, what we are finding in the aftermath is we still don't have in place policies which lead to some unanimity of opinion as to whether the problems that are identified at plants of this nature can be identified with backfit, with retroactive fitting of equipment that will guarantee that the accident can be addressed. It is greatly disturbing to the Congress to find that after Three Mile Island, then after Davis-Besse, we still have this kind of disagreement. That is the significance of the problem. It really spotlights significant disagreement that exists on the Commission, a significant ambiguity that exists in the law and as a result, significant unanswered safety questions that the public has to live with because of this confusion that exists on a law that ought to be clear and implementable on its face. Mr. Chairman?

Mr. PALLADINO. Mr. Chairman, what you are getting different answers to is a speculative question, not one that has actually gone, that we have addressed in an actual case. So you can have differences of opinion.

I have heard two different staff opinions. I have heard opinion for the Davis-Besse type of incidents this pump wouldn't have been needed, but for other incidents it would have been needed. Now, let me go through this backfit rule carefully with you. If the proposal is subjected to cost/benefit analysis and statement of reasons and it does call for substantial overall improvement, but it does say that we are not going to use that to get rid of diversity or defense in-depth, there is a procedure that when the analysis is made and it calls for a backfit, there is an opportunity for appeal.

It is a two-step appeal process. It evidentally goes to the EDO. There is one feature in this rule I consider very important that did not exist before in any of our backfitting, and it took me a while to discover it, that the Executive Director for Operations was entirely out of the chain of backfitting except for the generic requirements administrative action we took and he is the person now that we can look to for effective backfit control.

I think our staff is knowledgeable enough to know whether there are defense in-depth questions and diversity questions that deserve additional attention.

Mr. **Markey**. I just don't know how either you or Commissioner Zech can tell us you have a well thoughout policy when there is no methodology and there is no procedure to ensure, in fact, that the kinds of safety features that in many instances have to be built into plants retroactively that that policy will, in fact, be implemented.

Mr. **Palladino**. Are you talking about the methodology for the cost/benefit analysis?

Mr. **Markey**. Commissioner Asselstine?

Mr. **Asselstine**. Mr. Chairman, I think what you are referring to is one of the answers to the questions that you provided where the Commission said in trying to decide what "substantial improvement" means, we don't have any guidance yet on what that means. We don't have a methodology; we don't have criteria to be used in making that judgment. That is really one of the key questions about the backfitting rule. When the Commission says that a backfit, to go forward, has to provide a substantial improvement in protection based upon overall facility operation, what does the Commission mean by that?

Is that a very high threshold? Does "substantial" mean what substantial normally means or is there some lower threshold or is there some way we can get around what would otherwise appear to be a very high threshold? What the Commission told you in the answer to the question is they put this rule into effect and they didn't have criteria or methodology for making judgments on what that means and I think what we are going to get into is a lot of wrangling over what "substantial improvement" means.

Now, there are a couple of things you can look to. You can look to what the Commission itself did in the Indian Point case where the Commission rejected a number of safety improvements for that plant that would have cut the risk from that plant in half. They did that saying they didn't think those improvements were substantial.

That sounds substantial to me. The second thing you can look to is a recent memorandum that Commissioner Roberts sent where he says not only does substantial mean "big," it means the biggest in arguing against or raising questions about whether station blackout changes are justified. The proposal that we now have before us from the staff, he argues, if there are other more significant contributors to reducing risk, then you can't do anything on station blackout. You have to basically ignore that problem until you have addressed the very biggest problem.

If that is what substantial means, it is even worse than I originally thought when the Commission adopted this rule.

Mr. **Markey**. My time has expired. The Chair recognizes the gentleman from California, Mr. Moorhead.

Mr. **Moorhead**. Thank you.

Mr. Asselstine, if Toledo Edison had installed a third auxiliary feedwater pump called for would the June 9 incident have been more severe or less severe?

Mr. **Asselstine**. I don't think the third pump would have made much difference on the June 9 event one way or the other, but I think there is a broader question and that is if the analysists had done a correct evaluation of the reliability of that auxiliary feedwater system as a whole and had understood how unreliable that system was, then I think we would have done a lot more to upgrade the reliability of that system overall, not just the third pump, but make sure there was a reliable feedwater system.

I think many of the things being done now after the events would have been done beforehand.

Mr. **Moorhead**. How long did it take to make the decision about this pump?

Mr. **Asselstine**. I understand in the chronology that we provided the subcommittee it went on literally for years. Part of the problem was there was an effort first to deal with the problem in the context of this particular plant. Then there was an effort to deal with this kind of problem generically.

When that ran into problems with our backfitting controls within the agency, the staff went back to the question of trying to deal with it just for Davis-Besse. I think that contributed to the problems, too.

Mr. **Moorhead**. I want to ask you this question and then I will ask the other members if they want to reply to it, too.

Will the new backfit regulation by creating a more disciplined process for evaluating modifications enhance the NRC's credibility and lead to a more rapid adoption of needed change?

Mr. **Asselstine**. I don't think it will. I am all for a more disciplined process. My feeling is that certainly if you look at changes that have been required in the past you are going to find some instances where there was abuse.

The system was not as formal as it should have been. My feeling was the changes that the Commission had already made, without adopting this rule, had dealt with those problems and had made for a better backfitting process.

I think this rule goes way too far.

Mr. **Moorhead**. Before I ask them to comment on this, I will ask you just one thing more then. Can't the staff in applying the backfit standard take your opinions, which seem on every issue to be different from the rest, into account?

Mr. **Asselstine**. Yes, they can. The question is what is going to happen when we are challenged about what this threshold means. When the Commission says in its regulation that we have to justify that this is a substantial improvement in every case, how much are we going to have to do to prove that? Because the licensees, if they disagree, are not going to sit still and say, "OK, fine, we had our chance and you made your decision and that is it. If they are not satisfied they are going to sue us over it." That is one of my problems with this is this backfit rule is a lawyer's paradise. It is just going to generate lots and lots of challenges to the efforts to impose safety requirements. I think it is going to have a detrimental effect.

Mr. **Moorhead**. Chairman Palladino?

Mr. **Palladino**. Mr. Moorhead, I think the one thing this rule will do is cause us to focus on the problems that we really have.

Let me give an example. One of the most difficult actions that we have to interpret is our fire protection rule. There are all sorts of requirements. Some are far more important than others, and I think a reliable or as reasonable a cost benefit and justification process as could be developed would identify which are the more important to do.

I think that is very essential for us to have. So this is not all negative.

We had an undisciplined process for backfitting. I think it is very important to have discipline. I believe the process will work. We have to give it a chance to work.

The Commission eventually has to face up to what comes out of the backfit rule and decide whether to continue it or not continue it. But I do think it produces a discipline that we didn't have in backfitting until now.

Mr. **Asselstine**. Mr. Moorhead, if I could add one comment on that.

The Chairman may be right that there may be one silver lining in this cloud and that is that the rule applies explicitly both to efforts to impose new safety improvements as well as to rollback existing safety requirements.

I think it may be very difficult under this rule to justify rolling back safety requirements because the Commission is going to have to demonstrate that will result in a substantial improvement in safety. And I think that the silver lining may well be that at least this will serve as a brake to efforts to rollback existing requirements.

Mr. **Moorhead**. One thing I wanted to bring out before my time is up, you have certain responsibilities on the Commission but we have responsibilities also.

One thing that is important for us—none of you seem to agree on things but I wanted to ask you, do you think if we had a more standardized design and procedures all the way down the line through legislation that we have been considering that it would make the process safer?

Mr. **Asselstine**. I think that is one area we probably all can agree on. I agree completely with what Commissioner Zech said earlier and with your earlier comments as well.

The use of standardized designs, the use of complete or essentially complete standardized designs before you start building the plant, particularly if care is given to providing an enhanced margin of safety in those designs, I think, would move us forward.

I think that would be a big step forward. If I have problems with some of the legislation that has been considered, it is that it doesn't go far enough. It doesn't require that standardized designs be used and require that those designs be substantially complete before the start of construction of a plant.

I think if it did that we would be a long way farther along.

Mr. **Moorhead**. Maybe if you would write a letter to our chairman, we could get some action on this legislation.

Mr. Palladino?

Mr. **Palladino**. Mr. Moorhead, Indian Point was mentioned earlier and the Indian Point hearing, the licensing board found that many of the improvements—and I don't know whether the word was most of the improvements that were put on there as a result of the TMI—did very little to reduce the risk at Indian Point.

As a matter of fact, I think the words were something like a fraction of a decade. They concluded that the plant was as safe with many of these backfits as it would have been without them.

That is the kind of thing that you like—that is why you want to get some discipline into the process, so you know which are important, which are going to do you some good and which are not.

Mr. Asselstine. Mr. Moorhead, I think it is worth noting though, that in the Indian Point case, both our staff and the licensing board that heard the case recommended to the Commission that they thought that the changes that had been proposed by the staff and the changes that the board recommended were beneficial changes that improved the safety of the plant. Those are the ones that the Commission itself rejected.

Mr. Eckart [presiding]. Mr. Roberts, do you want to respond?

Mr. Roberts. I want to mention one thing about standardization.

Standardization has taken, the term has taken on a life of its own and everyone is looking that this is going to be some panacea and a cure for the future. Unless we radically change the way we do business in this country, you are never going to have one standard plant.

At the time the last reactor was ordered, there were at least four manufacturers of reactors. So assuming those four are alive and well, and that is open to dispute also, under no sense would we ever have one standardized plant. It can't happen that way.

There are other ramifications, a number of architect engineers and constructors and so forth. So let's not labor under the delusion that some magic words that talk about standardization, we are going to come up with one type of plant. It won't happen that way.

We can change our form of government and do as the French do. Everybody likes to castigate the U.S. nuclear industry and compare it to the French. They have an entirely different system, and that is not the way so far, to date, we have seen fit to do business in this country.

Mr. Moorhead. If you have one or two or four that are all wrong, obviously it won't do you any good.

Mr. Roberts. Of course not, but four might be doable.

Mr. Moorhead. Every plant being different today you might have a problem.

Mr. Roberts. Couldn't agree with you more.

Mr. Eckart. The time of the gentleman has expired.

The gentleman from Florida is recognized.

Mr. Bilirakis. Thank you, Mr. Chairman.

Staying on that particular point, Mr. Roberts, I don't understand. If a set of specifications is set up for standardization, why can't we have standardized plants?

Mr. Roberts. You could certainly have a very general set of specifications that would call for a "standardized plant," but the difficulty in the past has been, and I say this having spent a lot of time as a manufacturer of components, it is one thing to get a set of specifications and get their drawings and come up with what something is going to cost, but when you get down to the nitty-gritty details of how the specific component is going to be manufactured, that is entirely different.

Mr. Bilirakis. It will be manufactured consistent with the specifications.

Mr. Roberts. It would, but what I am saying is you could have four reactors that met general specifications that would be different in their detail and still meet the general specification but those four and if four plants were built with those four reactor vendors they would be different.

They would meet a general specification, but they would not be cookie-cutter carbon copies.

Mr. Bilirakis. Why couldn't that specification be less general and more specific?

Mr. Roberts. Well, if they got too specific you could possibly eliminate some of the suppliers. Do we want to do that? I am not sure.

Mr. Bilirakis. Well, we have serious health and safety considerations as well the future of nuclear power to consider. What is the best to eliminate, suppliers or health and safety?

Mr. Roberts. The underlying presumption of course is a safe design. That is not in debate.

Mr. Bilirakis. You are discussing here a third pump and all of these technical design things which are limited strictly to this plant. So you are not really—you might be solving or hopefully solving the problem as far as this plant is concerned--but you are not solving that problem insofar as the overall industry is concerned.

The reason you are not doing that for the most part is because you have lack of standardization. Isn't that right, Mr. Zech?

Mr. Zech. I believe so.

Mr. Bilirakis. It is a "no-brainer," if I might use that term, we have some sort of standardization.

I would ask, since you all seem to agree that there should be a degree of standardization—Mr. Roberts may not agree completely as the rest.

Mr. Roberts. I agree with that.

Mr. Bilirakis. If that is the case, doesn't the Commission have the authority to require standardization at this time?

Can you mandate it, Mr. Chairman?

Mr. Palladino. I don't believe we have the authority to mandate legislation.

Mr. Bilirakis. Have you tried to mandate it?

Mr. Palladino. No, but if we want to know what the law says, I think I had better turn to my legal people.

Mr. Asselstine. If I may, I think we do have the authority. I think the Commission could propose a regulation that could say in the future all we are going to consider are standardized designs.

And I agree entirely with you, while you can't nail down every individual item of the design of the plant, you could go a long way to standardizing those key elements that are of safety significance in the design.

When we begin to look at the plants in terms of their capability on auxiliary feedwater after the Davis-Besse event, and also their capability to put water into the system at high pressure and temperature, we found out that there were several different categories of plants, lots of different categories based upon the different configurations of the individual plants. That just doesn't make sense.

We ought to be able to say with some degree of precision, these are the kinds of characteristics we expect from a design and issue a proposed rule that says: "Because of the safety advantages of going with standardization, we think that the Commission ought to only consider standardized—"

Mr. Bilirakis. Before we get into a response from the legal people at the suggestion of the chairman, the industry, as I understand it, is also for standardization, are they not?

Mr. Asselstine. They are, but there are lots of differences within the industry. Architectural engineering firms, for example, have made an awful lot of money off designing 95 different plants. That is the way they make their money.

Mr. Bilirakis. I am talking about the nuclear industry.

Mr. Asselstine. The reactor manufacturers and utilities tend to be more in favor of standardization.

There is a problem also in terms of developing of the detailed standard designs. There is sort of a chicken-and-egg situation going on where the reactor manufacturers are saying, "Before we spend the $500 million or so to develop a detailed standard design, we want to see the orders," and the utilities are saying, "Until we see something that is really complete and a substantial step forward, we are not prepared to order something." So there is a little bit of a circular problem.

Mr. Bilirakis. May we hear from legal counsel on that subject, Mr. Chairman, before you gavel me out of order?

Are we going to hear from the legal people very briefly on that?

Mr. Plaine. I am Herzel Plaine, general counsel.

I think what the problem is at the moment, one is talking about standard plants for the future and the other is talking about, how do you standardize what you now have? I think that is your problem.

Mr. Bilirakis. If we can't standardize the future, how are we going to ever approach standardizing what you have? I think that is beyond the realm of possibility, standardizing what we now have.

How about the future?

Mr. Plaine. I think that can be done but I think it is probably better by legislation than trying to——

Mr. Bilirakis. In the meantime, plants are going up, and we are sitting here, Mr. Chairman, with all due respect, I think wasting taxpayers' time and wasting taxpayers' dollars.

We probably will solve the problem in Representative Kaptur's area; as far as that particular plant goes, I guess we will, but we are not solving the overall mess as far as nuclear reactors are concerned throughout the country.

Mr. Eckart. The time of the gentleman has expired.

Ms. Kaptur has to depart for another hearing and the Chair would defer to her for purposes of asking questions.

Ms. Kaptur. Thank you, Mr. Chairman and members of the committee.

I understand that another area of disagreement among members of the commission has to do with this committee's request for an independent, internal investigation of the Nuclear Regulatory Commission's responsibility for the Davis-Besse incident. In fact the NRC has failed to undertake an internal investigation of its own.

As I understand it the reason there is a difference of opinion is that some members of the Commission feel that such an internal trouble-shooting investigation might delay the restart of Davis-Besse.

What concerns me is that although there is a lot of attention being devoted to Davis-Besse right now, how will that effect other power plants around the country and your responsibility to assure the health and safety of the citizens, Mr. Zech, as you put so very well?

I guess I am concerned as to why the Commission has chosen not to go ahead with an independent internal investivation of NRC's responsibility knowing the seriousness of this situation.

Mr. PALLADINO. Ms. Kaptur, I think you raise a very important question. We were split.

However, I took it upon myself when I got back from extended travel to our office of inspector and auditor to get started on the investigation, and if there is a vote that overrides me in this, then we would have to abide by that vote.

But I do not think it is very important to get this investigation under way and I so directed the director of office of inspector and auditor. But this points out one of the reasons why I always am for a single administrator.

Mr. ASSELSTINE. Ms. Kaptur, if I could add to that. I think I was probably the strongest proponent of an internal review of a number of different issues. The way it sorts out, it looks like I might get my choice on one issue rather than the several that I preferred. But I think that it is important to have an independent review for a couple of reasons.

First, I think that it is an attempt without trying to point blame at individuals or people within the organization, as pointed out in my opening comments, I think there are a number of people in the organization, on our regional staff as well as at our headquarters staff, that made a lot of good efforts at Davis-Besse. It didn't work as well as we would have liked, but they made some good efforts.

I think it is not a fault-finding exercise. It is what can we learn from this so we can fix the process so that this doesn't happen in the future. There are more of these Davis-Besses out there ticking away waiting for something like the June 9 event or worse.

I think for purposes of credibility, we really do need an independent group. I think it is unrealistic to expect the same people that we are responsible for making those decisions to be able to approach the issue in a completely objective manner without saying, "well, I have to justify what we did."

When you tend to look at the information that has been developed yourself, you look at: "here is the list of all of the things we tried to do", rather than "what does this tell us about why the system didn't work." Were we approaching it wrong? What needs to be done to restructure the system so that we really are involved on things like management, operations, and maintenance and testing—areas where we have traditionally not been as highly involved as we need to—and what do we need to do to make sure in the future when we find these weaknesses, we get them fixed before something serious happens?

Ms. Kaptur. Well, if I could just commend those Commissioners who would support those of us who think an independent investigation is important.

As I remember, I stated in the letter which I would call to your attention, that if a plane had crashed and no one was injured, the FAA would certainly embark upon an independent investigation if it had been aware that a serious malfunction had existed for 6 years or that there were problems within a system. I think that the analogy is very similar to what happened in this situation.

So if I could have any influence on those Commissioners that may not favor an independent investigation, I think it might be best to put your weight on the side of safety and reconsider an independent investigation.

Mr. Palladino, I think you wanted to say something?

Mr. Palladino. Ms. Kaptur, to do justice to my colleagues that are not agreeing with me on how to proceed, they are for investigations. It is a question of how independent it should be.

Commissioner Asselstine made a five-point proposal. I made some comments on it to try to strengthen it, at least so far as I saw it. He agreed with me, and when we were split I felt we could not allow ourselves to be at an impasse and it is better we started with the independent investigation than to not do so, and so that is what I have directed.

Mr. Eckart. My time has expired.

I will yield to Mr. Asselstine for purposes of responding.

Mr. Asselstine. I think your analogy in the airline industry is a good one. In the airline industry, there is an independent group, the National Transportation Safety Board, which has responsibility for looking at accidents and for looking at significant operating events in the transportation field, not just in the airline area.

We don't have that, and my feeling, and I think, some people within our organization, including members of our Advisory Committee on Reactor Safeguards, say we need that kind of organization.

My hope was the Commission would be willing to set up an internal group. It would still be under the Commission but it would be sufficiently independent to take a look at these things. I know Commission Bernthal had agreed with me on that.

If the Commission is unwilling to do that, as it appears to be, then I think maybe it is time for the Congress to consider having a truly independent group outside of the control of the Commission to look at these things, something akin to the National Transportation Safety Board. I know some members of our Advisory Committee on Reactor Safeguards have been strong proponents of that view.

Mr. Eckart. Mr. Asselstine, if we could only get Mrs. Dole to appoint and fill all the vacancies at NTS, we could retain some of its independent authority.

I will next recognize my colleague from Ohio, Mr. Oxley.

Mr. Oxley. Thank you, Mr. Chairman.

I was unfortunately delayed, but I got a chance to look over Mr. Moorhead's opening statements. I would like to quote it because it really puts a lot of things right on the money:

> Failure to standardize nuclear plants has condemned us to remain in a reactive posture. We are trying to use ad hoc measures and hindsight to correct problems that would have been resolved had we focused resources on standardized plant design.
>
> Further, our customized plants preclude the possibility of standardized construction, quality assurance, and most importantly, with respect to Davis-Besse, maintenance programs.

Is there anybody on the panel that disagrees with that statement by Mr. Moorhead?

We have over 50 cosponsors of legislation on standardization that was introduced by Mr. Moorhead and 11 of those happen to be members of our committee.

It seems to me that instead of the usual Monday morning quarterbacking and handwringing that goes on every time we have a perceived problem, that it might behoove the Congress and particularly this committee to move that legislation or legislation similar to that.

I am wondering if anybody on the panel has a comment about that, particularly Mr. Roberts, because I understand where you are coming from. But would the Commission support legislation not unlike the Moorhead approach that would indeed set some form of standardization?

Mr. Chairman?

Mr. PALLADINO. Well, Mr. Oxley, I think the Commission is pretty well sold on the concept of standardization.

One of the most important aspects of standardization is bringing about an essentially complete design before you start building and then you have—and that takes a lot of up-front money, but once that is done, then you can replicate the plants if there are customers.

I would not envision in this country a single standardized plant as I think that would violate our antitrust laws as I understood them.

But I would expect that, just as Ford, General Motors, and Chrysler have standardized models, I would expect vendors to come up with standardized models, that they would find it beneficial to design completely and then go sell, and I think we would gain even from that.

Mr. OXLEY. Mr. Chairman, to follow up, does your legal counsel share your concern about the standardization process, particularly as it relates to the antitrust laws?

Mr. PALLADINO. Well, it was my impression they did.

Mr. BURNS. I am Stephen Burns. I am in the Office of Executive Legal Director.

I have not looked at the question closely but I think the chairman is correct, that there are antitrust implications from it.

I think there are also implications under the Atomic Energy Act itself. The act does not mandate in any one of its provisions a specific approval by the Commission of a specific or a single design. It says the Commission shall take such steps as are necessary to assure public health and safety.

I think a utility or vendor might be able to come to the Commission were it to promulgate regulations that said it would only approve a single design and say the Commission had exceeded its statutory and constitutional authority by imposing such a limitation.

In effect, the Commission, as Commissioner Asselstine stated, could promulgate regulations that encourage and in effect pave the way for a single design or a number of alternative designs, but for it to mandate a particular design, I think, might raise statutory questions under the Atomic Energy Act, the antitrust laws, and even under the Constitution.

Mr. OXLEY. Aside from the potential constitutional question, it seems to me, though, that the Congress would have some leeway in providing waivers or some kind of opportunity for the industry to work with us and with you to try to deal with this problem and to try to overcome that institutional problem that Mr. Roberts commented on—the difference between our system and the French system—which I don't think we want to necessarily adopt totally, but again, I think we can learn from our European cousins about some of those standardization prospects.

Mr. BURNS. I would agree with you, sir.

Mr. OXLEY. Thank you.

Mr. ASSELSTINE. Mr. Oxley, I think we could go pretty far, though, even without the legislation.

On the antitrust concerns, I think you get into trouble when you begin to get so specific in the design that you mandate a particular supplier—in essence, if you close out alternate pump manufacturers, for example.

If the design is so specific, the only way you can meet that design is with one manufacturer and that others then are closed out of the competition, then I think you run into some difficulty.

I don't think you have to go that far. What you need is a standardized design that resolves, is sufficiently complete to resolve all significant design issues and that can still leave some flexibility in terms of specific manufacturers of components.

Let me make one comment on the legislation. I support standardization. I support legislation that would encourage or require it.

My problem with——

Mr. OXLEY. You have indeed submitted legislation, have you not?

Mr. ASSELSTINE. The Commission has, and I have commented separately on that legislation.

I couldn't support this year's Commission bill because I think it suffered from a couple of flaws, and I think Mr. Moorhead's bill suffers from those same flaws, quite frankly.

One of those is I don't think it goes far enough. The legislation, it seems to me, ought to basically say that standardization is what is required and that you need a sufficiently complete standardization design, standardized design at the outset to resolve all of those significant design issues before you start building the plant. This is intended to get away from this design-as-you-build approach that we have taken in the past, and that has been the cause of a lot of the problem in the past.

Second, I think the legislation ought to mandate improvements in construction quality assurances so that we don't have a repeat of the kinds of problems that we have had over the past 5 or 6 years with some plants.

Third, I think that the legislation that is before the committee goes too far in cutting the public out of the process. I am all for limiting public participation so that people have one opportunity to raise issues. But I think the legislation goes too far in basically preventing members of the public from obtaining a hearing on some legitimate safety issues.

Mr. **Oxley**. Thank you.

Thank you, Mr. Chairman.

Just in closing, I think the issues have clearly been framed here and I would certainly urge the chairman of this subcommittee that we start markups as soon as possible on this very important legislation, particularly since we have at least 11 members of the committee who have indicated their support for some type of a standardization bill.

And I appreciate the comments from all of you in that I think that we are indeed on common ground here and it is a matter of working out some of the differences that we have. But clearly the trend is in the right direction.

Thank you, Mr. Chairman.

Mr. **Eckart**. I thank the gentleman.

I would suggest that I would support standardization, but maybe not necessarily of design but probably of the Commission.

Mr. **Oxley**. Do you have a bill to that effect?

Mr. **Eckart**. I am getting real close to doing that.

Let me ask the Commissioners, I am real concerned about this cost/benefit analysis. Did, or would the NRC cost benefit analysis requiring a third auxiliary feed water pump, does it include the estimate of the cost of an averted accident?

Mr. **Asselstine**. I don't think it does.

One of the drawbacks of cost/benefit analyses and particularly of the Commission's backfit rule is it stacks the deck in favor of the costs of putting the change in and against the benefits.

Mr. **Eckart**. Asselstine is at best not sure, leans no.

Mr. Palladino?

Mr. **Palladino**. The question is not so simple to answer because you give consideration to a particular point, you have to consider also its probability.

So to say, well, here is the averted cost of an accident, if you go that route and don't factor in the probability, you never, you never stop backfitting no matter how trivial, because you can say, well, this would save a particular accident from happening; therefore, we have the averted cost of the accident, and it overrides anything else.

But if you take into account the probabilistic nature of that, then I think you are in a halfway reasonable approach.

Mr. **Eckart**. Let me finish my survey.

Mr. Roberts?

Mr. **Roberts**. I think our procedures do not.

Mr. **Eckart**. Mr. Zech?

Mr. **Zech**. Costs, you say averted costs. Averted costs, could you define that a little bit better? I am not sure what you mean by that.

Mr. Eckart. Let's use the example of the cost of replacement power, about $273,000 a day, about $1 million so far for Davis-Besse.

Mr. Zech. Should that be considered in a cost benefit analysis?

Mr. Eckart. Yes.

Mr. Zech. I think all costs should be considered. I don't know you should say you weigh the dollars and come up with a certain figure would be the answer, but I think the costs should be considered and that is what the cost benefit means to me.

Mr. Eckart. Mr. Asselstine?

Mr. Asselstine. Yes, Mr. Eckart. When you look at averted costs, there are a couple of those. In fact, there are lots of averted costs of an accident that you can look at that, in my view, are benefits of a new backfit.

For example, the radiation exposure to the public; you don't have that if you don't have the accident. That is in now, OK, under the Commission's backfit rule and that is routinely considered.

Another is you avoid contaminating public property, property off the site of the reactor. That is not in the Commission's backfit rule. I tried to get it in and my colleagues wouldn't agree to put it in. So that is out.

Another one is the value of the plant itself. If you don't have an accident, what you are doing is preserving a valuable asset that will continue to generate electricity over the remaining lifetime of the plant. That is not included. I tried to get that included in the backfit rule; my colleagues rejected that one as well.

So there are many of the costs of an averted accident, the benefits that would come from imposing a new safety requirement that have been consciously excluded from this rule and that are routinely excluded from the Commission's consideration.

The practical effect of that is to slant the cost/benefit analysis in favor of rejecting safety improvement to focus on the costs of putting the change in, and there the backfit rule is quite explicit. Every conceivable cost is in.

Mr. Eckart. A lot of these things become definitional, so what is a substantial increase? If, in fact, that becomes the test, then I need to know how you define the test.

What are the methods? What are the criteria by which you quantitatively, systematically define a threshold value for substantial?

Mr. Asselstine. There aren't any. The short answer to that is, the answer that the Commission provided to the subcommittee is that there aren't any criteria or methodology for making that judgment as to what is substantial.

I agree with you; that is the key question. That is the test.

Mr. Palladino. Mr. Chairman, I just can't accept that answer because we have quite a bit that we supplied to the subcommittee that explains what substantial means. It is right in the rule.

I think it is worthy of reading. It goes on for several pages, but if you say——

Mr. Eckart. This is your answer to No. 6?

Mr. Palladino. Yes.

Mr. Eckart. I would ask unanimous consent the Commission's 3-page answer to No. 6 be submitted as part of the record, without objection. [See p. 50.]

What I want to focus on, Mr. Palladino, is the end of your answer. I am reading from it verbatim. "There are currently no specified methods or criteria for systematically and quantitatively specifying a threshold value for 'substantial.' "

Mr. **Palladino**. That is correct, but still that doesn't say we don't define "substantial."

In the regulation business, you can be very prescriptive and say at this level it is substantial and below this level it is not substantial. We didn't choose to do that because this whole business involves a lot of judgment. And there are two points that I still maintain are very important points of judgment; that has to do with diversity and defense in depth.

So because we chose to keep some flexibility doesn't mean that the rule doesn't define what we mean by substantial. We mean nontrivial.

Mr. **Eckart**. Mr. Keppler, let me ask you some questions.

One of my paramount concerns is, what does this all raise? Mr. Bilirakis pointed to it. We are talking about a valve and we are talking about a series of individual incidents that contributed to a larger incident.

You focused in your recommendations about the effect about continuing management difficulties at Davis-Besse. According to NRC documents, Davis-Besse has been a problem-plagued facility for years.

During 1980, you had several meetings between yourself and Toledo Edison to help improve management controls. You knew there was a problem. That is the good news. The bad news is you couldn't do anything about it.

What does that say about the NRC's inspection and, thus, influencing and enforcement capabilities over individual utilities?

Mr. **Keppler**. To the contrary, Mr. Eckart, we realized some progress from the efforts we made at that time.

Toledo Edison's performance did show improvement over the period 1981 and 1982, and it wasn't until late 1983 that we started to notice a decline in that performance. So I think our efforts back in 1980 were somewhat successful.

Perhaps where we made a mistake, if I could say it that way, was that we backed off the intensity we put into that project at that time, and I think the utility sensed that and perhaps backed off on its efforts as well.

Mr. **Eckart**. So is NRC equally culpable with the bad management of Davis-Besse?

Mr. **Keppler**. I don't think so. If I learned something from this accident, it is that we were doing something about the problem. We just weren't successful in bringing about corrective action in an appropriate timeframe.

Mr. **Eckart**. Why? Are you telling us the operation was a success but the patient died?

Mr. **Keppler**. No; I am not. I am telling you that we were concerned about the operation but, in my view, the operation was not unsafe.

I had brought the concerns about this operation to the attention of my management. We had discussed it. The Commission knew about our concerns about Davis-Besse. Commissioner Asselstine was out with me to the site on one occasion.

We were uncomfortable, but not uncomfortable to a point that we felt the plant ought to be shut down. We were trying to——

Mr. ECKART. But Mr. Dircks said in a letter—and I want to quote it—"recognizing we cannot run the plants for the licensees, in retrospect the actions taken by the NRC at Davis-Besse were not sufficiently effective. The timeliness to effect corrective action was too slow. Stronger enforcement action, for example, an order to modify the license or to derate the power level until corrective actions were completed, could have been pursued to obtain more timely corrective action."

You didn't push the right buttons regulatorily available to you.

Mr. KEPPLER. That is something with 20/20 hindsight.

Mr. ECKART. This is Mr. Dircks' 20/20 hindsight.

Mr. KEPPLER. I wrote that answer. I do feel that way.

One of the steps that I have initiated in my own region right now is to not only be more astute in terms of determining there is a problem there, but trying to bring about corrective actions in a shorter timeframe.

I agree with many of the statements that have been made here today. There are some lessons to be learned, and I think we are doing it, but if you sat and were working with the same set of circumstances back before this accident happened, I didn't have, in my view, a basis to say that plant ought to be shut down. I certainly felt it needed improvement, but I strongly didn't believe that way, and if I had felt that way, I would have taken action to shut it down.

Mr. ECKART. I appreciate your candor.

Mr. Dircks, I quoted you and I ought to give you the opportunity to defend, amplify, modify, deny your quote.

Mr. DIRCKS. No. That is exactly what I said in that memo.

I think the point, Mr. Eckart, that we are all realizing is that when we get into the regulation of operating facilities, it is a different matter than when we get into the matter of licensing facilities. It is easy for NRC to go in and say there is a defective pump or valve, take it out and correct it.

When you are dealing with the management of a corporation that is governed by a board of directors and financed through their own private means, we as Government regulators have to be on very sure ground when we say we don't like the behavior of certain vice presidents; we don't think they are managing in a correct way. They have done nothing absolutely in contradiction to our regulations, but they are not performing up to the standards we think they should be performing to.

I think we have taken a long time with Davis-Besse and I think we were faced with a problem. We were dealing with individuals that we did not feel comfortable with, but we certainly treaded very softly in getting up to the point of saying remove people, change your management, or we shut you down.

Now, I discussed some matters with the Commission yesterday. I think we have learned some lessons from Davis-Besse. We are not going to approach these plants in an isolated equipment-by-equipment manner or system-by-system manner. We are trying to get now into a very comprehensive look at how these facilities are managed.

Now, the question is, when do we step in and pull the string and close facilities down? I think we are going to be a little more vigorous in the future, a little more daring, but every time we do this, I think you can expect then this industry to be coming up here and complaining that we have overstepped our bounds.

Mr. ECKART. I can hear the argument very clearly. If you shut them down, they have very expensive plant to which revenues are not accruing through electricity that they are selling to my constituents.

On the other hand, if my math is correct, northwestern Ohio constituents, and I guess now it is part of the CEI merger, are going to be spending $31 million to buy power. I mean, either way, my constituents get stuck paying for somebody's bad decision through you shutting down the facility because of a reason or because you allow it to go forward, and thus it has to be shut down for even a more protracted period of time and then they have to go buy power.

It is $31 million out of my constituents' pockets because of what you viewed as the fundamental root cause of the incidents to be bad management there.

One of my concerns is how they got bad management, and you said in a letter to the subcommittee, the Commission stated that "financial considerations played a role in Davis-Besse's poor management, which has now been faulted as the root cause of the June 9 incident."

The Agency, I guess, is concerned about the possible impact on safety because of financial constraints of utilities.

Does the Agency have a target list? Maybe I ought to ask the Commission members.

Of utilities that are experiencing financial difficulties and thus, are you putting them on a special watch list of safety implications?

Mr. PALLADINO. Mr. Eckhart, could I interrupt? Could I either be excused for three or four minutes, or could you take a short break?

Mr. ECKART. Sure, we could do that.

We will stand recessed for 3 minutes.

[Brief recess.]

Mr. ECKART. The committee will come to order. Mr. Chairman Palladino? I understand you have been traveling long distances and picked up a cold in some other set of circumstances.

I did not mean to conduct this hearing such as it became an endurance test——

Mr. PALLADINO. I appreciated the break. Thank you.

Mr. ECKART [continuing]. Or to see how long that Sudafed would last. I am glad you mentioned that, and the Chair is happy to accommodate you.

The point we had left was my question to Mr. Dircks and the financial implications that utilities find themselves in as various PUC's turn down or limit rate requests and the implications thus for safety.

I believe, Mr. Palladino, you wanted to be heard on that question.

Mr. PALLADINO. No. I was looking for a break.

Mr. **Eckart**. Mr. Dircks, then let me ask how this issue of yours contradicts the Commission's publicly stated position of the financial qualifications of rulemaking which excludes consideration of finance for the issue of operating plants?

How do these things square? Do we have a target list? Are there other utilities you suspect may be in financial straits and, thus, are cutting back on operation, maintenance, and safety?

Mr. **Dircks**. This is rather a late development we have taken some note of. We have looked at some of the actions of some of the State public utility commissions which have, in their attempt to protect the consumers, been putting some very restrictive holds on utility costs, and the ability of utilities to recapture of costs through rates.

So, in the middle south area, we know that the State PUC's of Mississippi, Arkansas, and Louisiana, did put some very tight restrictions on these utilities down there. We were concerned that the utilities, in order to meet their cost decrease goals, would take those cost savings out of what we consider essential safety areas, the management of procurement, maintenance, training, and other areas which sometimes suffer when utilities cut back.

We wrote to those utilities and said, we are going to be watching them very carefully.

Mr. **Eckart**. Is this a change in the economic position on this question?

Mr. **Dircks**. We have not yet made a policy change proposal to the Commission. We have got one letter back from one of the utilities that said the action of the PUC's would have no effect in their essential safety areas.

I think what we are trying to do is gather some information to come back to the Commission, if needed, with some policy changes.

Mr. **Eckart**. Now, could you share with the committee the list of the utilities and the reactors involved which you suspect or at least are concerned?

Mr. **Dircks**. Well, in the Middle South area, we are concerned about the Grand Gulf facility, we are concerned that in the Arkansas facility, the Arkansas nuclear power project, and the Waterford facilities, that there would be restrictive cutbacks in the expenditures on safety items.

Recently, I received a letter from the CEO of Southern California Edison that indicated the PUC staff out there had, in challenging certain costs that the company was trying to put in its rate base, indicated that the utility should be held accountable or should not recapture any cost in safety improvement, above what NRC requires.

We thought that was not a good practice. NRC lays out minimum requirements and utilities should be encouraged to go way beyond those minimum requirements.

Mr. **Eckart**. Do you expect to recommend a change of policy to the Commission?

Mr. **Dircks**. Again, I think I am going to have to get the responses back from the utilities. I think what we will try to do is work with our regional people to see whether this is becoming an increasing problem, and then we will come back to the Commission with any policy proposals.

Mr. Eckart. I thank you for your—Mr. Asselstine, do you want to be heard on this issue?

Mr. Asselstine. Yes, if I could, Mr. Eckart, on this issue. The Commission adopted its financial qualifications rule a little while ago, saying in licensing procedures, we don't have to consider the financial qualifications of the utility.

The factual basis that was used for that rule was to basically say that these are regulated industries that public utility commissions routinely provide the funds necessary to assure the safe operation of plants, and therefore, we don't have to worry about it.

I think Davis-Besse, and other instances that Mr. Dircks mentioned, fundamentally undercut the validity of that factual basis for the Commission's regulations. I think we have to reconsider the matter or else we will be challenged in court, and I think it may well be the Commission would lose on the point.

We would be a lot better off to take another look at it.

Mr. Eckart. It is my understanding someone may have to backstop on this question. As Mr. Dircks suggests, you have States with nothing more than NRC and in your judgment, that potentially deals with health, human health questions, then I hope somebody out there will be the safety net if it is necessary to reevaluate this.

I realize the tremendous consumer pressure on PUC's, particularly if they are publicly enacted PUC's. So I hope we can count on your continued observation and observations, because we get in trouble if you don't.

Mr. Zech. I think you can. I think we did exactly the right thing at the time. However, as time goes on and times change, if it does look like this is going to be a problem, as Mr. Dircks has pointed out, then he brings forth a recommendation.

I think we should perhaps reconsider and I think that is acting responsibly.

Mr. Eckart. Two very short points I want to make. One of the revelations about Davis-Besse was the apparent lack of calibration or improper calibration of motor operated valves.

How many of these valves were at this particular plant? Mr. Denton?

Mr. Denton. I don't have that number, Mr. Chairman. Let me see if someone in the audience does.

Mr. Asselstine. I think it was on the order of 80 safety-related ones, as I recall, 80 or 81, something like that, motor-operated safety valves.

Mr. Palladino. May we provide the answer for the record?

Admiral Williams. One hundred and sixty-six safety-related ones, and I think it was 220 total.

Mr. Eckart. Now, do I understand these valves were tested after the mishap, and that several failed again? In your report of investigation, I understand that was one of the findings.

Admiral Williams. I would like Mr. John Wood to answer that, if you don't mind. He is manager of Construction Engineering, and he was the one that conducted those tests.

Mr. Eckart. If he is with the utility, we ought to ask that question.

The last question I have, gentlemen, I understand there have been recommendations that seven nuclear reactors, similar to

Davis-Besse, be issued to upgrade the auxiliary feedwater issues to comply with NRC's reliability criteria, specifically which plants are involved, and does this mean that all other plants fully comply with the current interpretation of the regulation?

Mr. DENTON. I can provide the list, Mr. Chairman. I don't have it handy, but I can get it in a moment, if you like.

Mr. ECKART. I would appreciate that.

Mr. DENTON. Basically, we would like to see all the plants in the United States have sufficient redundancy, diversity and reliability, the approach which we have required since Three Mile Island.

The plants specifically that we have identified as requiring an upgrade are Prairie Island 1 and 2, Haddam Neck, San Onofre 1, Arkansas 2, Fort Calhoun, Arkansas 1, Davis-Besse, Crystal River 3 and Rancho Seco.

Mr. ECKART. Is it fair to say as a result of Davis-Besse, you are requiring upgrading on at least seven of these other plants?

Mr. DENTON. We are requiring these other seven be upgraded to today's standards of reliability, yes.

Mr. BILIRAKIS. Mr. Chairman?

Mr. ECKART. Mr. Bilirakis, I will be happy to hear from you.

Mr. BILIRAKIS. If you would yield, I would appreciate it.

On page 6 of your testimony, Mr. Palladino, you referred to your process for monitoring the performance of monitoring reactors in the area which must be identified by the NRC.

You talked about the substandard evidence that must be identified and corrected before it becomes a threat to the public safety, and then you go on, "The Commissioner's proposals as to how best to proceed, supplemented by staff comments, are now under Commission review."

That is actually taking place?

Mr. PALLADINO. Is that Mr. Oxley?

Mr. BILIRAKIS. Bilirakis. You can't confuse an Oxley with a Bilirakis although we are both named Mike.

Mr. ECKART. People have tried.

Mr. PALLADINO. We had proposals from Commissioner Asselstine that identified areas, as I recall, that he felt needed attention with regard to this matter. I proposed some modification to it that he agreed with, but we did not get support for the entire procedure as yet, however, as I indicated earlier, this one that calls for some independent investigation of NRC's performance, I asked the Director of OIA to go ahead, our Office of Inspector and Auditor, to go ahead and carry out that investigation until there are three votes that tell me not to.

Mr. BILIRAKIS. Are these proposals and this investigation intended to be a broad picture type of thing, not strictly limited to Davis-Besse, but on a broad basis?

Mr. PALLADINO. Yes.

Mr. BILIRAKIS. It is.

Mr. PALLADINO. At least in part.

Mr. BILIRAKIS. What can we as a committee do Mr. Chairman, to direct this to the Chairman of the Commission? I am a proponent of nuclear power, lest anybody out there doubt that. I am concerned that incidents such as this are going to hurt the picture greatly, and we have got to do something about it.

I don't mean solving it on an incident-by-incident basis. That is after the cow has already the left the barn, and that is why we keep talking about standardization.

I guess what I am saying here is that if, in fact, there are proposals of how to proceed, supplemented by staff comments and whatnot, I wonder, will we be out of line, Mr. Chairman, if we requested copies of that documentation?

Is it a little premature at this point in time, but if it is premature, can't we set some sort of a date to find out what is actually taking place regarding these areas?

Mr. Palladino. Right off the top of my head, I don't see any problem in providing what we have gotten so far. What I said, in part, there were five points that Commissioner Asselstine made, and some of them were specifically to Davis-Besse, and some of them were more general in scope, and that is what I meant by in part.

Mr. Asselstine. Mr. Bilirakis, I wonder if I could just add a comment or two? While I agreed with the chairman's modification to my plan, I felt half a loaf was better than no loaf at all, I am still a little concerned that what we are going to do may not give us the real broad brush look that we need.

I think you put your finger right on the key point. In the past, our regulatory approach has been to basically say, unless we can point to a significant, specific event, we are going to hold off in taking specific action.

We are not going to shut down a plant unless we can point to some specific event. What that has translated into is allowing marginal performance, substantial weaknesses in some of these key areas that we saw at Davis-Besse to go on for long periods of time.

We go back and find them. We would hold meetings with their management. Every year, we would give them another review, and it would be bad. We weren't getting the kinds of changes that needed to be made.

Then you have a significant event. Now, we can do something. After Davis-Besse now, we can jump in and things get fixed. I agree with you, that is not an acceptable way of doing business for the future.

What we need to do is identify the weak performers and be able to act on that basis and say this is not an acceptable level of performance. We are not going to sit back and wait for something serious to happen—an accident.

We are going to tell you, if you don't shape up within a specified period of time, we are going to shut you down or do something else to make sure that changes really get to be made.

Until we get to that kind of a more aggressive posture, then I think we are going to continue to see these kinds of events. I hope Mr. Dircks, when he said we are going to be a little bit more aggressive and a little bit more out front on these things, I hope we are going to be a lot more aggressive in dealing with these things.

Mr. Bilirakis. Mr. Asselstine, are you a proponent of nuclear power?

Mr. Asselstine. Yes, I am, but I am also a strong believer in the very view that you expressed, that is the continuation of these

kinds of events or worse events are the most harmful possible thing to the operation.

Mr. **Bilirakis**. Thank you.

Mr. **Eckart**. The gentleman's time has expired.

I recognize the gentleman from Utah, Mr. Nielson, do you have any questions?

Mr. **Nielson**. I apologize for not being here to hear the testimony. I only have one question, and that is I read Mr. Markey's opening statement, I read Mr. Palladino's statement, and I get two different impressions.

In Mr. Markey's opening statement, he says the worst accident, the most serious nuclear mishap since the 1979 accident of Three Mile Island, and it goes through in general and talks about how poor things were and how you weren't on top of it, even though you knew the problem.

I would like to ask, Commissioner Palladino, in view of the chairman's opening statement, it was the most serious mishap since 1979, and could have caused tremendous amounts of problems, why did our NRC not crack down on Toledo a little more than they did?

Mr. **Palladino**. Mr. Zech made quite a few comments on Mr. Markey's opening statement. But let me try to respond to your question. We do consider this to be a important incident. We learn from all our incidents.

I think there are two points that you can draw from this incident. One, we would very much have liked to avoid it. We want to prevent accidents. We don't operate the plants. All we can do is make sure that people that are operating the plants are well-geared to do so.

Our staff has been on top of the plant, but there is one lesson that we learned that I wanted to bring up earlier, and I think that relates to this incident more than any other lesson, and that is that there has been great deficiency in our post-maintenance testing, because had these valves and systems been tested after maintenance was done, we would have identified in advance that some of these would not have operated.

I think that is a lesson that we have got to incorporate into our system. Let me say this, Mr. Nielson. If you think we are going to go without ever having incidents, I think I would be misguided in believing that.

We are going to have incidents. The issue is have we designed these plants, have we trained our people so that we have enough defense in depth, enough diversity so we can ride them out?

When we learn that we had less diversity than we would have liked then, I think we have got to make corrective action, but we also learned another lesson, and that is that we have got to reexamine the way we monitor and use the information we get on our performance reviews.

Mr. **Nielson**. Perhaps I had better ask Mr. Zech, how did you respond to the Chairman's statement that, question two statements; one was, were the principal lessons of TMI forgotten or simply never learned?

The Chairman has mentioned that you did learn the lesson. You learn and you apply them later, but how did you respond to that statement, were the——

Mr. Zech. I didn't respond specifically to that one, Mr. Nielson. I think the lessons have been learned from Three Mile Island. They have been broadly disseminated. I think that the utilities have responded in a rather satisfactory manner to all the requirements that have been put on since Three Mile Island.

I think there are still some actions that we are tracking that are taking place, but I think that the broad assumption that nothing has gone on since Three Mile Island or to even allude to that is inappropriate.

There is a lot of action that has been taken since Three Mile Island and a lot of improvements. I can tell you from my experience in visiting plants all over the country, it is my assessment that the plants are much better operated now than they were before Three Mile Island.

Many lessons have been learned, many improvements have been made, and the utilities and the industry itself is doing a much better job since that.

I would hope also we would learn from this Davis-Besse incident, and I think we will, and I think it is important that we do, and I think that is exactly what we are trying to do.

Mr. Bilirakis. Will the gentleman yield?

Mr. Nielson. I want to make just one comment. As one that comes from an area that produced uranium or did until things shut down, and a strong proponent of nuclear power, I am concerned about the chairman's other statement.

He said the reactor at Davis-Besse is the same as the one at Three Mile Island. That doesn't bother me, except the Zech statement, the Commission has asserted this is acceptable—wait a minute.

The auxiliary feeder water system fully complies with the current regulatory requirements, and he said plants designed by other vendors also fail to comply with current NRC regulations.

It doesn't quite read right, but anyway, the basic idea of this statement is that not only Davis-Besse, but other reactors don't fully comply with current NRC regulations.

That is a rather serious statement. I am wondering how you respond to that?

Mr. Asselstine?

Mr. Asselstine. Mr. Nielson, let me add a comment, and it is tied in with the earlier question you asked. I think in a sense, the Chairman is right on not learning one of the lessons from Three Mile Island and that is, we learned from TMI that this auxiliary feedwater system is a very important system, particularly for the Babcock and Wilcox designed reactors. We thought we had improved these systems to the point where they were highly reliable. We found out from the Davis-Besse event that, in fact, that auxiliary feedwater system was highly unreliable because of the problems in maintenance, testing, and operations at that particular plant.

Mr. Nielson. Was it lack of maintenance and testing that caused the problem, or the design itself?

Mr. Asselstine. Well, it is a combination itself, I think, of several of those things.

Mr. Nielson. How do you respond, either your or several of the Commissioners, how do you respond to the statement that plants designed by other vendors also fail to comply with current NRC regulations?

Mr. **Asselstine**. I think the fact our staff has gone back now and identified a number of other plants where they want to make changes to upgrade these auxiliary feedwater systems is a good indication.

We have learned one of the lessons from Davis-Besse that we need to go back and take a hard look at some of these plants and get those systems upgraded, and that is what our staff is doing.

Mr. **Palladino**. I suggest we ask the staff. Mr. Denton is here.

Mr. **Nielson**. Mr. Roberts, did you want to make a comment first?

Mr. **Roberts**. Please. We all hope that we learn over a period of time, and that applies to all of us, and certainly this agency as an institution, and there are some older plants out there that at the time they were licensed, the agency thought they were safe.

We continue to think they are safe to operate, however, as we learn more, and as things evolve over a period of time, our standards are higher.

So, yes, in fact, a plant that has been out there 8 or 10 years may not in fact meet all of our current requirements. That does not mean we think it is unsafe for the plant to operate.

It met the requirements that were there and in place at the time the plant was licensed and built. In these circumstances where we think so-called backfits are required to insure complete confidence in safety or reasonable assurance of safety, we make them make changes and modifications, but it is in fact literally correct to say there are some operating plants out there that do not meet today's requirements.

That does not mean to say they are unsafe.

Mr. **Nielson**. I yield to the gentleman from Florida.

Mr. **Bilirakis**. Well, I thank you for yielding. I think I would like to express my gratitude and the gratitude, I think, of the American people, to all you gentlemen. You have got a tough job.

It is not a tough job, you have an impossible job, and I just don't really know why anybody would want to do it. You do, and I know you know you are faulted by us and you are faulted by the public, and you deserve some of that, maybe, some of that blame, but you have got a pretty darned impossible job.

I guess I am not going to ask this question in terms of getting a response from you now in the interest of time, but in general, we are here to help you, and if standardization is going to help you, then let us know, so we can put the pressure to get one of these bills or all of these bills on the floor, and whatever other areas might be involved.

Thank you, Mr. Chairman.

Mr. **Nielson**. I yield back my time.

Mr. **Eckart**. Mr. Palladino, you are recognized to respond.

Mr. **Palladino**. I wanted to point to one lesson we learned from TMI that helped Davis-Besse and that was that instead of trying to identify accidents and set procedures in advance how to respond, we went and learned this from TMI to treat the symptoms and the effectiveness of that change in philosophy and the training that went with it is what I think helped the operators there bring this matter under control at Davis-Besse.

Thank you.

Mr. ECKART. Mr. Oxley?

Mr. OXLEY. Just a very short question, if I may.

Mr. Palladino, you stated, I think, in your response to my series of questions about backfitting, about the term substantial increase in public health and safety.

Do you equate that with nontrivial?

Mr. PALLADINO. In my mind, I would equate it to nontrivial.

Mr. ECKART. Do the other Commissioners agree with that?

Mr. PALLADINO. I don't want to get caught in semantics.

Mr. ECKART. I understand. I am trying to define it as best as I can myself.

Mr. ASSELSTINE. That would be an acceptable definition from my standpoint.

Mr. ECKART. Should have probably asked you last.

Mr. ROBERTS. I want to think about it, but I think the whole thing rests on—and the chairman said this earlier—it is a matter of judgment. Now, I don't know how one writes out guidelines of judgment.

I don't know how you quantify it and I think equating it with nontrivial or trying to find some semantics here misses the whole point, and that is, why we, for whatever reason, whether we got our arms twisted or wanted to be here, it is our responsibility to make that judgment, and you can't quantify it, and put it in some nice words, and put little boxes for everything to go in.

It is judgment.

Mr. ECKART. It is that judgment that calls us all to task from time to time. I am just trying to figure out what the parameters of the roadmap are.

Mr. ROBERTS. We certainly have to be accountable for the judgments that we make.

Mr. ECKART. Mr. Zech?

Mr. ZECH. I agree with that. It is judgment. I think substantial and nontrivial, I don't know how people look at that. Substantial is certainly not trivial, but I agree with Mr. Roberts.

In the long run, many of these things we are trying to quantify require an analysis. They require advice from experts. They require, if we can obtain one, a rather quantifiable figure, and when you look at some scientific engineering things, you can get numbers that are substantiated.

We use all that we can. But it does in many of these cases come right down to a judgment. We are using our best judgment just as you are, and that doesn't mean it isn't something we should do in a very serious and careful and thoughtful manner.

We are trying to do that the best we can. We will keep doing that.

Mr. ECKART. To the Commissioners, your policy statement on severe reactor accidents focuses on the term, I think, being the question of no undue risk to public health.

Mr. Roberts, we just spoke about that for a second about a plant that may have been built a number of years ago to then those appropriate standards, and the whole backfit question, because it was built then to those standards doesn't necessarily mean that it is an unfit or a plant that would pose undue risks to public health and safety.

Even though you may require, as Mr. Dircks says or Mr. Denton, seven other plants to backfit third auxiliary pumps. Is that a real terrible balancing act?

I mean, you are telling the American public, well, there is no plant that is an undue risk to public health, yet we have got seven here we think ought to do this.

Mr. **Roberts.** I don't see any conflict there. We are saying this is something that will make these plants even safer than we think they are.

Mr. **Palladino.** Mr. Eckart?

Mr. **Eckart.** Yes, Mr. Palladino, please?

Mr. **Palladino.** I am drawing on my memory, but I think there have been a couple of plants that were so far off the mark in the Commission's thinking, and this is not in my day, but an earlier Commission, that were told either to shape up or shut down, and I think, isn't Indian Point one among those—those that did not have at least the basic system?

Mr. **Asselstine.** Indian Point I was.

Mr. **Eckart.** Does the Commission agree that Davis-Besse I posed no risk prior to the incident?

Mr. **Zech.** I do.

Mr. **Palladino.** Yes.

Mr. **Asselstine.** I don't. I have to say at the outset——

Mr. **Eckart.** I might make a lot of money predicting the votes at this table. I am sorry I interrupted you, Mr. Asselstine. Go ahead.

Mr. **Asselstine.** At the time I went out to the plant, I talked with our Regional Administrator about it. He told me his judgment, that he didn't think that the plant should be shut down at that point, that it did not pose that significant a risk and at the time, I agreed with that.

When I look back on it now with hindsight and particularly with what happened on June 9, I have to say I think I was wrong. I think that plant did pose a risk. I think the kinds of widespread failures of equipment that occurred on June 9 that went beyond the design basis for the plant, went beyond the kinds of things that we expected, are unacceptable. If I had known at the time that there was that potential, I would have said yes, that that poses an undue risk, and the plant should be shut down until some of these things are fixed.

I think if we don't do that, what we are doing is approaching the problem from the standpoint that we will wait for something serious to happen before we really get some of these problems fixed. I think that is going to do more harm than anything else.

Mr. **Eckart.** Mr. Denton, given our earlier exchange, knowing what you knew about maintenance and its effect today, about operator capability and its effects today and the excellence in operator training, how do you answer the question?

Mr. **Denton.** We have the benefit of hindsight now that we didn't have on that day. On that day, I didn't feel there was any undue risk. Certainly, if I had known all the pumps were going to fail, I would have considered that, I think, an undue risk, and would have acted to try to prevent it.

We are all looking through a "retrospectroscope" to see what might have been done differently.

There is one other area I did want to clarify. You had mentioned the $30 million cost to the consumers because of the lost power. That is not a factor we consider in making decisions about when to upgrade the feedwater system.

Our decision is made based on the potential for the reactor to expose the public to an unsafe condition offsite. So our calculations do not include the cost to the utility of the reactor being shutdown during this period, because of an event like this.

Obviously, the downtime has cost much more than what the feedwater system would have cost. However, our decision is based on the potential for the release of nuclear contaminants to the public.

Mr. ECKART. In your meetings with Toledo Edison, have they ever expressed a financial need they might be in concerning restarting the plant in the foreseeable future? Has the economics of the company or the cost of the downtime been a factor in any of your discussions?

Mr. DENTON. That was raised, I think, early on as a possible factor, and has never been raised again.

Mr. ECKART. What did they say to you?

Mr. DENTON. Oh, concern was expressed that if the NRC didn't move rapidly to investigate and make a determination it could really strap the company. But that never got brought up again in any of our technical meetings or the inspections that Mr. Keppler made.

Mr. ECKART. You didn't feel you were being constrained or pressured in any way?

Mr. DENTON. I didn't feel constrained at all, and I still don't.

Mr. ZECH. Mr. Eckart?

Mr. ECKART. Mr. Zech, please.

Mr. ZECH. I would like to associate my earlier remarks on cost aversion with Mr. Denton's explanation right now. I agree with what he said, and I think my earlier remarks perhaps were, I was thinking in a more general sort of way on costs, so I would like to make sure the record is correct in that regard.

Thank you.

Mr. ECKART. It shall. Mr. Asselstine?

Mr. ASSELSTINE. I think what Mr. Denton has done is describe what the situation is in terms of the costs that we do, and do not consider. For the life of me, I don't understand why we shouldn't consider those very costs.

If we know that if something serious happens, it is going to cost the utility a lot of money, a substantial amount of money or it has the potential to damage the plant so they don't have that asset. If we are going to consider the cost of putting the change in, if we are going to consider the costs of replacement power while you make a safety improvement in the plant, then why in the world shouldn't we consider the benefit that goes with making that improvement?

Sometimes in hindsight, if you looked back at what made sense in this case, of course it made sense to fix that auxiliary feedwater system. You could have had a gold-plated auxiliary feedwater system and gold-plated maintenance program for far less cost than the cost incurred.

Mr. ECKART. General Dynamics will build one for you real easily, I am sure. There is a potential conflict emerging here. Mr. Dircks is making suggestions about folks we ought to watch, and you saying we have got to be very careful about what the Atomic Energy Act originally allotted for us.

I have no additional questions, and Mr. Palladino, I hope your cold enjoys a quick recovery. I want to thank you all.

Mr. ECKART. We will proceed with our next witness.

If you could identify those who are accompanying you at the table, starting to my extreme right over here, so the reporter can get their names and their positions?

STATEMENT OF VICE ADM. JOE WILLIAMS, JR.

Admiral WILLIAMS. Mr. Chairman, thank you very much.

On my extreme left, your extreme right, is Mr. Sushil Jain. He is heading up the group that is doing the—he is Toledo Edison engineer heading up the group that is doing the analysis work on methods by which we can improve the decay heat removal and looking into other aspects of the June 26 event.

Mr. John Wood is manager of the civil structural engineering group and is the gentleman that we selected to direct the recovery effort, from a technical standpoint, from the events that happened, specifically events that happened on June 26.

Mr. Ted Myers is manager in the licensing department, Toledo Edison, and Robert Peters is his deputy.

Mr. ECKART. Let me just call you Admiral. I do want the committee and the record to take note of your distinguished career of public service to the people of the United States and we are delighted that you are here.

We are delighted with the reputation that is preceding you here as a tough DI, if I can use another expression from another service, trying to insure that Toledo Edison comes into conformance.

And I would ask you if it is appropriate for you, to summarize your remarks, to refer as necessary to the experts who have accompanied you. Admiral, you may proceed.

Admiral WILLIAMS. Thank you, sir. I have some prepared remarks. We have submitted for the committee volume 1 of the course of action we have recommended to the NRC.

Mr. ECKART. Without objection, the Admiral's entire prepared statement will be made part of the committee record.

Admiral WILLIAMS. All right, sir.

We have submitted that, and I have a few remarks that I will read, if that is all right with you, sir.

Mr. ECKART. Please proceed.

Admiral WILLIAMS. Good morning, Mr. Chairman. I am Joe Williams, Jr., senior vice president, nuclear, with Toledo Edison Co. I am here today relative to the regulatory implications of the June 9, 1985 loss of feedwater event at Toledo Edison's Davis-Besse nuclear powerplant.

Following my statement, I will provide a portion of our September 9, 1985 report on the course of action which Toledo Edison is following as a result of the June 9 event, and request that it be admitted to the record.

Mr. **Eckart**. Without objection.

Admiral **Williams**. Thank you, sir.

I joined Toledo Edison effective July 1, 1985, as part of a major program to restructure and strengthen the nuclear mission at Toledo Edison. That program started well before the June 9 event and had its inception in the company's response to the December 1984 systematic assessment of licensee performance.

In his February 4, 1985 letter to region III's regional administrator, Mr. James Keppler, Toledo Edison's chairman and chief executive officer, Mr. John P. Williamson, committed the company to improved performance at Davis-Besse.

A number of actions aimed at meeting the company's commitment to excellence were already underway at the time of the June 9 event. These included new maintenance and training facilities now under construction, and a plant specific simulator with order placement being negotiated for March 1986.

Since June 9, more steps have been taken. A major increase in the staffing of the nuclear mission has been approved, from 699 to 930. Highly qualified and experienced personnel have been brought in to fill key positions in maintenance, planning, and operations.

The nuclear engineering division has been restructured and substantially enlarged with 90 new positions identified and approved.

I have also made other major organizational changes, to strengthen the management effectiveness and the operating performance of the Davis-Besse plant, including moving essentially the entire nuclear mission to the plant site.

The June 9 event occurred after I had agreed to join Toledo Edison, but before I actually arrived at Davis-Besse. The event involved the temporary loss of both main and auxiliary feedwater. What this meant was that no feedwater was recovered through manual operation of the startup feedwater pump and the auxiliary feedwater system. No radioactivity was released from the plant. The nuclear fuel itself did not overheat and did not lose its cooling. No significant damage occurred to any plant systems or equipment.

The loss of feedwater event was promptly and successfully terminated due in large part to the excellent response of our plant operators. The symptom-based plant procedures, a post-TMI development, helped guide the operators through the various equipment problems which occurred. The June 9 event reminds us again of the importance of well-trained operators. Their response was professional and reflected their understanding of their systems, and the quality of their training.

Most troubling to me was the series of equipment problems which occurred on June 9. I considered the number of equipment malfunctions to be a very serious sign. As a result Toledo Edison has put in place, and has largely completed, a comprehensive program to understand and correct these problems.

Under this program, Toledo Edison has thoroughly analyzed the sequence of events; identified root causes of equipment problems; reviewed operating procedures and training; evaluated the impact on plant systems or components; evaluated enhancements to plant design and operating practices to improve the reliability and availability of post-trip decay heat removal.

A major part of the program is a system review and test program. This program evaluates the 31 systems with most impact on safe plant operation to identify known significant or recurring maintenance problems, reviews the existing surveillance test program, and includes a test program to assure that these systems are fully functional under all plant conditions.

This program is described in greater detail in the course of action report. I might add, that is a living document. There are changes that have been submitted to it. Toledo Edison has devoted substantial resources toward a thorough analysis of the June 9 report, and the implications of those problems. We have identified the underlying problems and are in the process of correcting them.

As I indicated earlier, our collective actions are not limited to the specific equipment problems which were experienced. The far-ranging management changes express our commitment to making Davis-Besse one of the best plants in the country. By making major changes in engineering, maintenance, training and planning, we will build on the strong and talented plant staff already in place. We are taking long and hard looks at every facet of the operation. And we are committed to expend whatever resources are needed to attain the standard of excellence which remains Toledo Edison's goal.

That is my prepared statement, Mr. Chairman.

[Testimony resumes on p. 184.]

[The report referred to follows:]

DAVIS-BESSE COURSE OF ACTION

VOLUME 1

TOLEDO EDISON

DAVIS-BESSE NUCLEAR POWER STATION

TOLEDO
EDISON

JOHN P. WILLIAMSON
Chairman and Chief Executive Officer
(419) 249-5225

Docket No. 50-346

License No. NPF-3

Serial No. 1182

September 10, 1985

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Denton:

In accordance with our responsibility pursuant to 10CFR50.54(f), I am submitting this letter and its associated attachment as our response to your August 14, 1985 letter (Log No. 1798) to Mr. Joe Williams, Jr., Senior Vice President - Nuclear, Toledo Edison, concerning the June 9, 1985 loss-of-feedwater event at the Davis-Besse Nuclear Power Station.

While this event resulted in no impact on the health and safety of the public, or release of radioactivity, the number of equipment malfunctions and the implications associated is unacceptable to me. As you indicated in your letter it is essential that we identify and resolve any programmatic and management deficiencies that contributed as underlying causes to the June 9 event, and we are doing that.

I believe you will find the attachment to this letter "Toledo Edison - Course of Action," explicitly addresses the concerns identified in your letter and the attachment thereto. As I stated in a February 4, 1985 letter to Mr. Keppler, Davis-Besse is our responsibility and I have committed the company to a program that will lead the NRC to rate our operation of the Davis-Besse facility as one of superior quality. The June 9 event has caused me to further strengthen this commitment and to take actions to expedite all efforts in our pursuit of excellence.

In my previous letter to Mr. Keppler, I indicated our intent to provide the leadership and the resources necessary to elevate performance of our operation of Davis-Besse. This effort was well underway prior to the June 9 event. As you are aware, retired Admiral Joe Williams, Jr. has assumed the position of Senior Vice President - Nuclear at Toledo Edison. Mr. Williams was committed to join us prior to June 9 and has since assumed the leadership role in assuring we achieve the standards of excellence that both he and I require.

THE TOLEDO EDISON COMPANY EDISON PLAZA 300 MADISON AVENUE TOLEDO, OHIO 43652

Our investigation of the June 9 event and the definition of the Course of Action for achieving excellence have been performed under his direction and with the full commitment of Corporate Management. We have already significantly upgraded the experience level and capabilities of our nuclear management staff and have reorganized and are staffing the Nuclear Mission to assure immediate improvements in the areas of maintenance, training, engineering, materials management, planning and plant management. We have also performed a major review of our salary structure for the Nuclear Mission and will be making any needed adjustments necessary to assure that Toledo Edison can successfully attract additional resources required to achieve our performance goals - and ensure stability of the organization.

I believe the actions already taken have significantly upgraded our capability to perform, but I wish to reiterate that we will follow the course of action necessary to achieve the desired standard of performance. I intend to stay intimately involved as we move ahead and will assure that Mr. Williams is provided with the support he needs to accomplish our common purpose.

We are committed to assuring that all necessary improvements are in place to support restart of the Davis-Besse facility on or about November 1. Following restart of Davis-Besse, we will continue to take the actions necessary to achieve and sustain the highest level of performance that both We and You expect.

I feel confident that you will find the attached document fully responsive to your August 14, 1985 letter. I, Mr. Williams and any members of the Nuclear Mission Management are available to meet with you and your staff to discuss our Course of Action.

Very truly yours,

JPWilliamson

John P. Williamson

cc: DB-1 Senior NRC Resident Inspector

TOLEDO
EDISON

JOE WILLIAMS, JR
Senior Vice President—Nuclear
(419) 249-2300
(419) 249-5223

September 9, 1985

Mr. John P. Williamson
Chief Executive Officer and
Chairman of the Board
Toledo Edison Company
300 Madison Avenue
Toledo, Ohio 43652

Dear Sir:

Forwarded herewith is the Toledo Edison Company's Course of Action which is in response to the August 14, 1985 letter from the Nuclear Regulatory Commission.

It answers the questions posed and the concerns expressed in that letter and contains our commitments regarding the specifics of the June 9, 1985 event, and those necessary to upgrade Davis-Besse to the level of excellence addressed in your letter of February 4, 1985 to the NRC.

Very truly yours,

J Williams Jr.

J. Williams, Jr.
Senior Vice President, Nuclear
Davis-Besse Nuclear Power Station

JW/bec

THE TOLEDO EDISON COMPANY EDISON PLAZA 300 MADISON AVENUE TOLEDO, OHIO 43652

10 CFR 50.54(f)

SUBMITTAL IN RESPONSE

FOR

DAVIS-BESSE NUCLEAR POWER STATION

UNIT NO. 1

FACILITY OPERATING LICENSE NO. NPF-3

This letter is submitted in conformance with 10 CFR 50.54(f) in response to Mr. Harold Denton's letter of August 14, 1985. This presents Toledo Edison's Course of Action for restart of the Davis-Besse Nuclear Power Station.

By J. Williams Jr.
J. Williams, Jr.
Senior Vice President, Nuclear

Sworn to and subscribed before me this 10th day of Sept, 1985.

Nora Lynn Flood
Notary Public, State of Ohio
NORA LYNN FLOOD
Notary Public, State of Ohio
My Commission Expires Sept. 1, 1987

I. INTRODUCTION

In a February 4, 1985 letter (Ref. 1) to the United States Nuclear Regulatory Commission (NRC), Mr. John P. Williamson, Chairman and Chief Executive Officer of Toledo Edison Company (TED) formally responded to the most recent "Systematic Assessment of Licensee Performance" (SALP) report for the Davis-Besse Nuclear Power Station (Ref. 2). In the response Mr. Williamson indicated:

> "I am personally committing this Company to a program that will eventually lead the NRC to rate our operation of the Davis-Besse facility as one of superior quality.
>
> Recovery to a full state of excellence cannot occur in a few weeks or months. We recognize this and we are prepared for a long term endeavor. We have made and will continue to make changes that will obviate or eliminate problems that are amenable to quick resolution. But we recognize that the real causes of our inability to achieve excellence are deeper-rooted and will take longer to identify in detail and to remedy in full."

Based on Mr. Williamson's commitment to improve performance at Davis-Besse, a number of activities were initiated during the spring of 1985. Paramount among these activities was an effort to fulfill the commitment that "...We intend to provide the leadership and the resources needed to elevate performance of our operation of Davis-Besse to a state of excellence...". A significant step was made in this direction when, in May, retired Vice Admiral Joe Williams, Jr. accepted the position of Senior Vice President, Nuclear at Toledo Edison.

Prior to the announcement of his appointment, Mr. Williams visited Davis-Besse, interviewed key personnel, reviewed relevant documents and reached initial conclusions confirming many of the concerns expressed by the NRC. Based on this review, Mr. Williams concluded that for Davis-Besse to achieve excellence in performance, actions had to be taken to increase the size and enhance the quality of the Nuclear Mission Staff; enhance the management experience in the areas of maintenance, engineering and station management; effectively plan and implement maintenance and modification activities; clarify responsibilities and establish accountability; expedite the implementation of TED's Configuration Management Program; and establish within Toledo Edison an in-depth, in-house engineering capability.

On June 9, 1985, subsequent to Mr. Williams decision to join Toledo Edison, the Davis-Besse Nuclear Power Station experienced a loss-of-main-feedwater transient. A number of equipment failures and an operator error occurred which resulted in a temporary loss of all feedwater flow. Feedwater flow was recovered through manual initiation of the startup feedwater pump and the auxiliary feedwater system. The plant was subsequently brought to a cold shutdown condition. The number of equipment failures which occurred during the June 9 event dictated the need for a thorough investigation into the causes of the failures and completion of the corrective actions necessary to prevent recurrence of such events.

Toledo Edison initiated a program which was summarized in a July 18, 1985 letter (Ref. 3) to the NRC. The specific goals of that program are summarized below:

- To thoroughly analyze the sequence of events, including performing investigations of the various problems to identify root causes.

- To analyze the results of the investigation to determine the existence of potential safety questions.

- To define and implement, prior to restart, any actions determined necessary to assure safe operation of Davis-Besse, and to determine those additional actions not necessary for restart that should be taken to further enhance reliability and facilitate safe operation. In this latter case, definitive plans for their accomplishment will be identified.

- To identify and correct weaknesses in plant programs, such as maintenance, training, procedures and administrative controls. Both the necessary short term (i.e. pre-restart) and longer term corrective actions would be addressed.

- To assure a complete response to NRC identified concerns.

Independently, but in coordination with the TED investigation, the NRC conducted a fact-finding investigation into the June 9 event. The results of this investigation were reported in NUREG-1154 "Loss of Main and Auxiliary Feedwater Event at the Davis-Besse Plant on June 9, 1985" (Ref. 4). By letter to Toledo Edison dated August 14, 1985 (Ref. 5), the NRC enumerated their concerns relative to the specifics of the event and their concerns regarding the apparent existence of programmatic and management deficiencies.

The fundamental NRC concerns were already being addressed as part of a "Course of Action" that Mr. Williams was formulating prior to the June 9 event, or as part of the specific program that TED was implementing in response to the specifics of the June 9 event. The submission of this document, "Davis-Besse Course of Action," reaffirms the commitment to achieve excellence expressed by the Company in Mr. Williamsons' February 4, 1985 letter and attests to the aggressive and responsible pursuit of fulfillment of that commitment. As part of the development of this Course of Action, all of the ongoing performance improvement activities and SALP generated actions have been reassessed and TED's future commitment in those areas is as stated herein.

This document also presents the investigation and corrective action program that TED initiated to consider problems brought to light by the June 9 event. Finally, this document provides specific answers to the concerns raised by the NRC in their

August 14, 1985 letter (Ref. 5) and also provides the basis for restart of Davis-Besse on or about November 1, 1985.

This document is organized as follows:

Section I - Provides a brief introduction to the Davis-Besse Course of Action.

Section II.A - Provides a brief overview of the management concepts that represent the foundation of TED's Course of Action.

Section II.B - Provides a detailed description of the Course of Action, including the actions related to:

- Restructuring and strengthening of Nuclear Mission organization and management.
- Incorporating the activities of previously existing performance improvement programs (e.g. SALP and PEP activities.)
- Improving maintenance planning, procedures and practices.

Section II.C - Provides the results of TED's investigation of the June 9 event including:

- The activities associated with completing the event investigation.

- The results of TED's review of the reliability of decay heat removal systems, including improvements which will be made.

- The analyses performed by TED to assess the safety-related consequences of the June 9 event.

- The procedure and training related lessons learned from the review of operator activities during the June 9 event.

- Control room improvements required based upon the June 9 event experience.

- Actions taken to improve the utilization of the Shift Technical Advisor.

- TED's comprehensive review of the design, operating experience and testing practices for safety related systems.

Section III - Presents conclusions and identifies the scheduled actions that will be taken prior to restart of Davis-Besse, as well as known longer term improvement activities.

Section IV - Includes Appendices containing results of the evaluations. The Appendices will be updated and revised, by future submittals, to reflect completion of additional evaluations and refinement of planned changes. This document and its Appendices will, when complete, address the questions raised in the August 14, 1985 NRC letter and will provide sufficent detail to justify restart of Davis-Besse. The specific concerns identified by NRC's August 14, 1985 letter (Ref. 5) to Toledo Edison have been addressed in this Course of Action. Table I identifies, for each concern of the NRC letter, the report section which addresses the concern.

TABLE I

COURSE OF ACTION ACTIVITIES RELATIVE TO NRC CONCERNS

Item No. from Enclosure to NRC letter of August 14, 1985	Detailed Course of Action Section Addressing the item
I.A & I.B	II.C.1
I.C	II.C.1 & II.C.2
II.A.1	II.C.3
II.A.2	II.C.2 & II.C.3[1]
II.A.3	II.C.4
II.A.4	II.C.6
II.A.5	II.C.1
II.A.6	II.C.4
II.A.7	II.C.2
II.A.8	II.C.1
II.A.9	II.C.5
II.A.10	II.C.2
II.A.11	II.C.1
II.A.12	II.C.4
II.A.13	II.C.7
II.B.1	II.C.4
II.B.2	II.C.2, II.C.4[2], II.C.5[3]
II.B.3	II.C.2
II.B.4	II.C.3
III.A	II.B.1
III.B	II.B.3
III.C	II.B.2
III.D	II.B.1

[1]. Issues related to single failures

[2]. Issues related to training of plant operators

[3]. Issues related to human factor aspects of control room equipment

II. TOLEDO EDISON'S COURSE OF ACTION

II.A Overview

Section II of this report provides details describing the course of action Toledo Edison is implementing to improve operation of Davis-Besse. This includes actions to strengthen management structure and practices as well as actions taken in response to the June 9 event. Underlying the actions being taken to improve overall management of Davis-Besse is a recognition of the need to accomplish certain objectives. These include:

- Provision of a functional organizational structure that further facilitates the control of, and enhances the quality and safety of operations, maintenance and support services (e.g., engineering) of Davis-Besse.
- Sufficient staffing with competent personnel.
- Compensation of personnel that is competitive in the marketplace.
- Clear articulation of responsibilities of personnel.
- Maximization of in-house capabilities and minimization of the use of contractors to provide higher quality support and increased accountability.

- Controlled use of contractor support, where necessary, ensuring that such support is backed by contractor management commitment.

- Reorganization of engineering staff to provide increased emphasis on leadership with experience in plant operations and operations support.

- Relocation of most Nuclear Mission personnel presently located at the corporate headquarters to the Davis-Besse site. This includes personnel from Nuclear Facility Engineering, Licensing, and Materials Services Department.

- Establishment of a configuration management program that includes accurate equipment/system data and accurate documentation.

- Operation and maintenance of Davis-Besse in accordance with appropriate operating/maintenance procedures which are established and maintained under the umbrella of site-wide Administrative Procedures.

- Training of sufficient quality to ensure personnel are continually competent to discharge their duties.

- Enhanced awareness of industry practices and positions on major issues of interest.

- Appropriate application of quality assurance/quality control practices to the balance of plant.

Specifically as regards the June 9 event:

- The equipment/system failures are being investigated, causes of failures determined, corrective actions taken, and appropriate confirmatory tests conducted.

- The generic implications of the equipment/system failures as they apply to other systems will be identified and addressed.

Finally, sufficient resources will be provided to accomplish the objectives of the TED Course of Action in a timely and responsible manner. This includes implementing those actions found necessary by review of the June 9 event.

II.B. DETAILED COURSE OF ACTION

II.B.1. Restructuring and Strengthening of the Nuclear Mission

Introduction

NRC's letter of August 14, 1985 and Section III of the enclosure thereto identified NRC concerns as to programmatic and management issues that may have resulted in a decreasing level of performance at Davis-Besse. Paragraph III. A of the enclosure to the letter raises a management and programmatic concern regarding "adequacy of Management Practices..." and paragraph III. D of the enclosure reflects concern for the adequacy of resources available and/or being applied to the short-term and long-term corrective measures.

Toledo Edison has begun actions to restructure and strengthen the Nuclear Mission, and to acquire the additional resources necessary to assure the continued safe and reliable operation of Davis-Besse. Consistent with the strengthening of the Nuclear Mission, major changes in management practices are also being implemented.

As stated previously, these actions are not simply a reaction to the June 9 event. In fact some were already in progress prior to June 9. The occurrence of the June 9 event, and the need to thoroughly investigate it and return the plant to service, has served to accelerate the Toledo Edison actions which are described herein.

AVAILABLE

Summary of Major Changes Within The Nuclear Mission

Prior to the June 9 event, Toledo Edison had already set in motion several activities directed at resolving deficiencies and implementing a program to improve performance. These included activities such as increasing the staffing of the Training Department and implementing of a Management by Objectives program. As stated previously, high on Mr. Williamson's list of priorities was the retention of an experienced manager to function as Senior Vice President, Nuclear. Mr. Williamson initiated discussions with Vice Admiral Joe Williams, Jr., (U.S. Navy Retired) in April, 1985, about assuming the position. After visiting the plant and interviewing key Nuclear Mission personnel, Vice Admiral Williams accepted the position in May, 1985. Mr. Williams' appointment as Senior Vice President, Nuclear, was announced on June 18, 1985. This action was the first step in an aggressive program to expedite a restructured and strengthened management organization dedicated to the effective maintenance and operation of a safe and reliable nuclear power plant.

Prior to Mr. Williams joining Toledo Edison, the Company had already allocated significant resources to a number of important improvement projects as listed below:

- A five-story, 100,000 sq. ft. personnel and maintenance shop facility integral to the station. This shop will enhance maintenance and provide significantly improved facilities for Quality Control, Engineering, and Maintenance/Outage personnel in close proximity to where the work is being performed. Ground breaking occurred on September 5, 1985 and occupancy is scheduled for November, 1986. The facility will house 380 employees. The cost estimate for the facility is in excess of $15,000,000.

- A greatly expanded Training Facility (34,000 sq. ft. exclusive of the simulator facility), which will include chemistry, health physics, mechanical, and instrumentation & control laboratories. Part of this complex is currently in use and completion of the remainder will be accomplished by December, 1985.

- Installation of an on-site, plant-specific simulator. This effort is being expedited with a scheduled operation date of December, 1988.

- Installation of a diversely powered feedwater pump. This project is currently scheduled for completion prior to startup.

Since his appointment, effective July 1, 1985, Mr. Williams has evaluated the existing management programs and activities of the Nuclear Mission and has implemented, is implementing, or has obtained concurrence of the Chairman of the Board and CEO, Mr. John P. Williamson to implement the following:

- A new organizational structure for the Nuclear Mission. This has has been approved and it will increase the staffing from 699 to approximately 930.

- Salary adjustments will be made to make TED truly competitive in recruiting talent and maintaining stability.

- A new highly experienced Plant Manager has assumed responsibility for the Davis-Besse Plant.

- The previous Plant Manager, with extensive operations experience, has assumed duties as head of the expanding Engineering Division.

- The Assistant Vice President, Nuclear has been assigned to concentrate his attention on Security, Personnel, and Administration. All of these functions are provided by Toledo Edison organizations outside the Nuclear Mission, and active liaison by the Assistant Vice President, Nuclear will assure the Mission's needs are met.

- The position of Assistant Plant Manager, Maintenance has been established and an experienced maintenance manager has been hired for that position.

- The position of Assistant Plant Manager, Operations has been established and filled.

- A new centralized Planning Department, reporting to the Plant Manager, has been established and an experienced manager has been hired as its Superintendent.

- The Maintenance Department has been reorganized and expanded. Experienced personnel have been hired for key positions in the restructured organization.

- The Nuclear Engineering Division has been substantially enlarged, and is being staffed.

- The Training Director now reports directly to the Senior Vice President, Nuclear, rather than to the Assistant Vice President, Nuclear.

- Detailed position descriptions are being written, reviewed and approved.

- Most Nuclear Mission and nuclear materials support personnel that were located at Corporate Headquarters are being moved to the site.

New Organizational Structure of the Nuclear Mission

Toledo Edison has restructured its Nuclear Mission management organization as shown in Appendix B.1.1. The new organization reflects the following features and enhancements.

1. The Senior Vice President, Nuclear reports directly to the Chairman and Chief Executive Officer. This structure has the following advantages:

   - It facilitates the Chief Executive Officer's role and increases his degree of involvement in overseeing the direction being taken by the Nuclear Mission and in fulfilling his responsibilities to the general public, Toledo Edison shareholders and the Board of Directors.

   - It allows for direct communications regarding Davis-Besse's needs to the highest level of management within the Company.

   - It places the Senior Vice President, Nuclear at a level which can effectively command all of the resources necessary to accomplish the Nuclear Mission objectives.

2. All Nuclear Mission directors with the exception of the Nuclear Services Director, report directly to the Senior Vice President, Nuclear.

   - This structure provides for clearly defined lines of authority and responsibility.

   - This structure reflects an effective form of control and accountability, as well as assurance of direct involvement by the Senior Vice President, Nuclear in the decision-making process.

3. The Senior Vice President, Nuclear has relocated to the Davis-Besse site to ensure strong management involvement and direction of day-to-day Nuclear Mission activities.

    - With the reorganization, most Nuclear Mission personnel will be located at the site to enhance communications and teamwork.

Key Management Appointments

A new management team has been assembled within the Nuclear Mission. This new team optimizes the utilization of experienced personnel from within the organization and includes new personnel whose extensive experience and knowledge will further enhance the effectiveness of the Nuclear Mission.

- Senior Vice President, Nuclear Mr. Joe Williams, Jr. has overall responsibility for Toledo Edison's nuclear program. A retired U.S. Navy Vice Admiral, he served 37 years in the Navy, beginning as a Seaman Recruit. He graduated from the U.S. Naval War College in 1956. Admiral Williams commissioned and commanded two nuclear-powered Polaris ballistic missile submarines. He advanced to the rank of Vice Admiral, serving as Commander, Norfolk Naval Shipyard from 1973 to 1974. He also held the position of Commander U.S. Submarine Force Atlantic Fleet.

After his retirement from the Navy, Mr. Williams became the Director of Nuclear Construction and Testing for the Electric Boat Division of General Dynamics Company. He held this position from 1977 to 1981. After leaving General Dynamics Co. he formed a consulting firm, Williams Research and Development Associates, where he gained considerable commercial nuclear power industry experience.

Prior to joining Toledo Edison, Mr. Williams was Senior Vice President - Nuclear Operations, for Cincinnati Gas & Electric Company, during 1983 and 1984. Mr. Williams comes to Toledo Edison with the conviction that the successful management of a nuclear program requires both commitment to excellence in performance within the organization, and an equivalent degree of professionalism from contractors, vendors, and other support organizations.

- Plant Manager Louis F. Storz has worked, since 1983, as Assistant Plant Manager at the Waterford 3 Nuclear Steam Electric Station. Before that, he was Assistant Plant Manager, Operations, at the V.C. Summer Nuclear Station for three years. From 1972 to 1979, Mr. Storz held various positions at the Point Beach Nuclear Plant, including that of Superintendent of Operations.

A graduate of the U.S. Navy's nuclear and electronics schools, Mr. Storz earned a Bachelor of Science degree in Mechanical Engineering from Purdue University and is a licensed Professional Engineer in the State of Wisconsin. Mr. Storz earned Senior Reactor Operator licenses for both the Point Beach and Summer plants. Mr. Storz has completed extensive training on Davis-Besse, including simulator training.

Mr. Storz brings to the project a solid nuclear operations background and the commercial nuclear industry experience needed to achieve the improved performance desired at Davis-Besse.

- Superintendent of Planning Michael E. Schefers was previously Planning Superintendent at the D.C. Cook Nuclear Plant, Units I and II, where he started as Chief Scheduler. Before that, he was Director of Site Data Base Management for Cincinnati Gas and Electric Company's Zimmer Nuclear Station.

Mr. Schefers held increasingly responsible positions for General Dynamic's Electric Boat Division from 1973 to 1983.

Mr. Schefers brings to the project an extensive background in coordination of complex, technical projects. He has considerable experience in maintenance and outage planning and has established expertise in developing and implementing computer scheduling systems. His recent experience with planning activities for operating nuclear power plants will contribute significantly to improved planning and performance of work at Davis-Besse.

- Maintenance Superintendent Stephen J. Smith was most recently a consultant specializing in nuclear plant maintenance. From 1978 to 1982, he worked at the V.C. Summer Nuclear Station where he held the position of Assistant Plant Manager, Maintenance.

  Mr. Smith is a graduate of the Navy's nuclear and engineering laboratory technician schools. He joined the commercial nuclear power industry as an Associate Engineer at the Babcock and Wilcox Company in 1977 following twelve years of service in the U.S. Navy's nuclear submarine program. Mr. Smith's extensive experience in establishing and managing maintenance programs at nuclear power facilities will significantly strengthen Toledo Edison's capability in this critical area.

- I&C Superintendent Carroll V. Phillips has more than 18 years of instrumentation and control (I&C) experience with both the military and the electric utility industry. Most recently, Mr. Phillips spent four years at the Waterford 3 Nuclear Steam Electric Station and also spent one year at TVA's Sequoyah Training Center. The designation of Mr. Phillips as a Superintendent demonstrates Toledo Edisons' recognition of the critical importance of the instrumentation and control function at Davis-Besse, which previously was directed at the Supervisor level. The combination of increased status in the management organization, coupled with the addition of Mr. Phillips, will significantly improve the contribution that the I&C group can make to the operation of Davis-Besse.

- Materials Management Manager Mr. Tom Chiles has been hired to fill this position. Before joining Toledo Edison, Mr. Chiles was Materials Manager at the Waterford 3 Nuclear Steam Electric Station, where he supervised personnel involved with the procurement of materials, computerized inventory control, expediters, and warehouse activities. Previously, he had been the Field Procurement Manager for Burns & Roe where he supervised the leasing and procurement of heavy equipment, piping, pumps, valves, motors, and generators for the Hanford II Nuclear Plant. He developed a set of traffic management procedures, purchasing procedures, expediting and material handling procedures which were used as the basis of nationwide procedures by Burns & Roe.

  Mr. Chiles bring extensive experience in both field and corporate material controls which will be a major asset to the Nuclear Mission in reaching its goal to have a procurement group which actively and effectively supports the Station.

Consolidation and Redirection of Nuclear Engineering

The Mission's Nuclear Engineering Division has been consolidated and redirected. Individuals with extensive operations experience have been integrated into the engineering group. The Engineering Division has been expanded from a single Division to four separate and expanded departments as discussed below.

- Stephen M. Quennoz, formerly Plant Manager of Davis-Besse, has been appointed Group Director, Nuclear Engineering. He brings to this organization the necessary and relevant plant operational background, and the charter to focus engineering activities to clearly support the continued safe and reliable operation of the station.

- A new Nuclear Plant Systems Department has been established within the Nuclear Engineering Division. This Department will provide dedicated expertise in the support of modifications and maintenance of plant systems. A cognizant engineer from this Department will be assigned to each system to handle maintenance problems (e.g. troubleshooting, preventive maintenance (PM) program, vendor manuals, spare parts), regulatory concerns (e.g. NRC IE Bulletins/Notices, Noncompliances), quality problems (e.g. Nonconformances, Audit Finding Reports, Surveillance Reports,) conditions adverse to quality (e.g. Deviation Reports, Licensee Event Reports,) surveillance testing (e.g. performance trending), and design modifications (e.g. Design Bases, Temporary Modification, System Descriptions, Test Procedures, Safety Evaluations).

  The Nuclear Plant Systems Department is separate from the design engineering staff although both are part of the Nuclear Engineering Division. The Nuclear Plant System Department will be headed by a manager who will interact with the Plant Manager's staff to support daily activities. The Department is responsible for responding to plant problems, providing design orientation information and oversight of all aspects of system operation and maintenance.

The establishment of this new Department in Engineering provides a highly qualified and accountable focal point for performing root-cause determinations for any equipment or system malfunctions. Such an organizational focus did not previously exist at Toledo Edison.

- The station Technical Section has been reassigned to the Nuclear Engineering Division and redesignated as the Operations Engineering Department. This will allow the station staff to concentrate on operations, maintenance, and chemistry & health physics activities. Areas such as reliability and performance (Nuclear Plant Reliability Data System NPRDS), ASME Section XI testing, turbine cycle code analysis, thermodynamic performance testing, computer applications (NSSS software support, SPDS development), reactor core follow (physics testings, fuel handling, reactor physics related codes), operational assessment (VETIP, INPO SOERS, root cause investigation, B&W transient assessment), and projects (DCRDR, ATOG integrated symptom oriented procedure maintenance) will now be the responsibility of the Engineering Division. This action is designed to bolster engineering input and ownership of responsibilities to support the station. The reassignment of the Technical Section also places additional personnel with direct Davis-Besse operational experience in the Nuclear Engineering Division and, when coupled with the newly established Nuclear Plant Systems Department will significantly increase Toledo Edison's capability for performing activities such as post-trip reviews.

- Engineering Services has been separated from the Nuclear Facility Engineering Department to provide a better framework for it to support the entire Engineering Division. The Engineering Services Department is responsible for the control of records, administrative processing of Facility Change Requests, drawing control, and distribution of vendor manuals. The Department is also responsible for implementation of a configuration management program and will be significantly expanding over the next few years. By providing dedicated supervision to this important area, it will also free up the Nuclear Facility Engineering Department to concentrate on engineering evaluations and design modification activities.

- All members of the corporate engineering staff presently located at Corporate Headquarters will be relocated to the site to facilitate communications and enhance the responsiveness of the nuclear facility engineering, design, system and operations engineering organizations.

Centralization of All Planning Activities

A major component of the Nuclear Mission restructuring is the creation of a centralized Planning Department within the station organization. Previously, planning and scheduling was included in the responsibilities of the Maintenance Department. The creation of a central planning group, independent of the maintenance organization, and headed by a superintendent, will establish control, coordination and accountability of all activities within the protected area of the station. The planning group will assure that appropriate work packages are prepared, spare parts are available, and plant conditions support conducting planned work. The Planning Department has consolidated personnel drawn from maintenance engineering, facility modification engineering and maintenance planning. The Planning Department contains an expanded, dedicated outage management section and computer systems section, in addition to the staff that is assigned responsibility for the daily planning activities. It is expected that the establishment of this planning group will allow for more efficient planning and scheduling of maintenance work at Davis-Besse.

Restructuring of Maintenance Organization

While Section II.B.3 discusses the maintenance program improvements in greater detail, it is noted here that the maintenance organization has been restructured to facilitate focusing the attention of maintenance on performing field work. In this regard and in addition to increasing the number of shop foremen, general foremen have been added to the electrical, mechanical and I&C areas (See Appendix B.1.1 for a Maintenance Department organization chart.)

Previously, the need to perform a variety of administrative duties diminished the time available for direct supervision of field work. The addition of several foremen per shop will result in more detailed supervision of the work effort. Furthermore, one of the foremen in each shop will be assigned specific responsibilities with respect to training. This foreman will identify training needs, conduct on-the-job training as required, ensure that the apprentice training program progress is satisfactory, and work with the Nuclear Training Department to coordinate maintenance training efforts.

Finally, the maintenance staff has been assigned responsibilities focused solely in support of performing daily maintenance work. Previously, the maintenance staff was utilized to address all aspects of the work effort, which included a significant administrative burden. Administrative duties reduced the time available for the staff to support field activities. The changes which have been made, including the new Nuclear Plant Systems Department, and the enlarged station Planning Department, will relieve the pre-existant administrative burden associated with maintenance activities.

Training Program Enhancements

In addition to the organizational structure changes, a new management approach to the training function will be implemented. Efforts are underway to more clearly define the company's training policy including the delineation of roles, responsibilities, interfaces and authorities of the Nuclear Training Division. The need was recognized to create a clear understanding between the Station and Training organizations with regard to training responsibilities such that qualification and training rests with the line organization, whereas the responsibility for the development and implementation of training programs rests with the training organization.

While Toledo Edison was one of the last nuclear utilities to commit to INPO accreditation, it is now striving to establish high quality training programs worthy of accreditation prior to the NUMARC committed date of December 1986. These performance-based programs are being designed to provide station personnel with the knowledge and skills needed to do the job correctly the first time. They will be based on the INPO Training Systematic Development (TSD) process.

The commitment to improvement in training is further exemplified by the following:

- New and expanded office and classroom facilities have recently been constructed which provide 26,000 sq. ft. of additional space and more than double the number of classrooms. These facilities and associated equipment significantly enhance the Toledo Edison Training Program capability.

- A major training laboratory construction project for Mechanical, Electrical, Instrument & Control, Chemistry and Health Physics personnel has also begun. These laboratories will add approximately 8000 sq. ft. for training and will aid in providing valuable hands-on equipment training and improve the ability to assess trainee skills. Completion is scheduled for December, 1985.

- The construction of an on-site plant specific simulator modeling the Davis-Besse control room. Bid specifications are being developed. The bid and review process is scheduled to result in contract signing in early 1986. The period from execution of the contract to simulator delivery is normally 32 to 36 months. TED will require as a contract conditon that the simulator be operational by December, 1988. The simulator will provide a greatly enhanced capability to both train and evaluate operators in a control room environment.

- The Nuclear Training Director will ensure policies, procedures, and resources are in place to provide for the ongoing evaluation of TED training programs to assure that needed program improvements and updates are properly instituted.

- The Nuclear Mission organization supports those changes necessary to make the training organization a viable career option. These changes will serve to attract high caliber, experienced individuals to the training instructor position. The training staff will be of sufficient size to adequately fulfill training needs, consistent with the recently restructured organization.

Additional Staffing

Additional resources are needed in order to make the Nuclear Mission more self-sufficient. Increased self-sufficiency will enhance accountability, increase continuity and provide the increase in morale that results when an organization can address and solve its own problems without undue reliance on assistance from outside Toledo Edison. Furthermore, the additional resources will strengthen the quality of the organization by increasing the depth of experience and breadth of capabilities.

There are currently (as of August 1, 1985) 699 approved positions within the Nuclear Mission. Approximately 230 positions are being added to the site staff. Of these 230 positions, over 90 are identified positions for the Nuclear Engineering Division. This represents a shift in company philosophy - a shift intended to strengthen internal engineering capabilities, reduce dependence on outside consultants, and thereby have engineers working on Davis-Besse problems who are an integral part of the organization and are inherently accountable. In addition to the major changes to the Engineering Division, other key staffing changes include:

- Chemistry & Health Physics (C&HP) will receive additional staff, both in the area of management and technicians. These staff additions will assure that C&HP can more effectively suppor shift coverage and outage activities without extensive reliance on contractor health physics personnel.

- Operations will have additional people added to the shift structure in order to man the fire brigade internally (i.e., eliminate the need to use Security personnel as part of the brigade) and increase the field support of plant operations.

- Emergency Planning will receive additional planners and technicians in order to continue to improve its performance.

- Quality Assurance/Quality Control will acquire additional staffing to improve the level of attention provided to the assurance of quality for balance of plant systems.

Toledo Edison plans to have all of these positions filled with permanent Toledo Edison employees by the end of 1986. In the interim, the necessary support will be provided by using contract personnel in all key positions. The goal for having the necessary contract personnel in place is December 1, 1985.

Additional Responsibilities for the Assistant Vice President, Nuclear

As mentioned previously, the Assistant Vice President, Nuclear has been assigned additional responsibilities involving Personnel, Security, and Administration. These areas are outside the direct control of the Nuclear Mission but are vital to its functioning. This assignment will provide a specific nuclear oriented senior management interface, resulting in increased support to the Nuclear Mission from these other organizations. A Personnel Administrator has been assigned to the staff of the Assistant Vice President, Nuclear to provide liaison to the Corporate Planning and Administration Mission on matters involving grievances. employment, management training, benefits and salary. The Assistant Vice President, Nuclear will also act as Chief of Staff to direct staff functions for the Senior Vice President, Nuclear and will function to ensure the mission directors are carrying out the policy and direction established by the Senior Vice President, Nuclear. The assignment of the Assistant Vice President, Nuclear to represent the Nuclear Mission in administrative matters will allow the Senior Vice President, Nuclear to primarily direct his attention to line management activities.

Improvement Of Management Practices

In addition to taking the actions previously discussed in this Section, a number of new programs and practices were, or are being, instituted to improve management effectiveness and Davis-Besse operating performance. These include:

- A program to write a definitive position description for each Toledo Edison employee associated with the Davis-Besse plant. The effort will result in clear statements of responsibilities and accountabilities, and will provide the basis for assuring that specific individuals are responsible for performing the functions required to safely and reliably operate Davis-Besse. These position descriptions are being written by supervisors in concert with the affected individuals and will include a description of exactly what work that person is responsible for performing. This effort has been initiated and is expected to be completed by October 30, 1985.

- The conduct of an extensive salary review. Once the Nuclear Mission site reorganization was formulated and approved, a review was undertaken to determine site-wide uniformity of grade levels, grade level consistency with position descriptions, and actual pay levels within the grade levels. All of these factors were then compared with a number of similarly structured operating nuclear power plants. This review, which has been completed, identified the need for a substantial increase in pay levels for most positions throughout the site organization. The review has been presented to the CEO and to the President and the results have received their concurrence. The Senior Vice President, Nuclear, has been instructed to submit a detailed plan for a phased adjustment of the salaries of personnel in the organization and has the authority to use the adjusted levels in recruiting the additional personnel required.

- A management style that promotes individual responsibility and personal commitment to performance will be utilized. This involves a number of management practices, all of which contribute to improved personal accountability. For example, the Senior Vice President, Nuclear, conducts a weekly staff meeting which includes all the key managers from the site including managers of contractor personnel. It provides a forum for plant problems to be aired with support and engineering personnel.

- A revised Materials Management System is being put in place. While materials management is not completely under control of the Nuclear Mission, an experienced manager has been hired to work at the site and oversee this important area. Procedures employed in the site's materials management program will be revised to assure that site needs have the highest priority and that the responsible personnel are so instructed. This effort will be closely monitored by Senior Management and if the desired improvements are not demonstrated, additional actions will be taken.

- A configuration management program to assure the effective management of plant changes at Davis-Besse will be established. The need for configuration management has been recognized for the past few years. However, an organized program for configuration management was not adopted. Portions of the concept, however, have been worked on as deficiencies were recognized. One example of this was in the area of drawing control which has received specialized attention in the last few years. Toledo Edison recognizes that this must be an integrated effort to address the problem in a comprehensive, well executed manner. Details of the approach to implementing this program are being reviewed at this time and a request for proposal will be issued by October 15, 1985.

Reassessment of Existing Corrective Action Programs

- One of the concerns expressed by the NRC with respect to Davis-Besse was the lack of progress in correcting deficiencies or weaknesses identified in earlier NRC reports or enforcement meetings. For example, there were some 175 items being tracked within TED's Performance Enhancement Program alone. As part of developing this Course of Action and including consideration of the resource needs associated with investigating the June 9 event, a reassessment was made of already initiated performance improvement activities to assure that the appropriate resources and schedule commitments existed. This effort is discussed in more detail in the next section.

Both the results of this reassessment and TED's review of the findings contained in NUREG 1154 have been included in the development of the Course of Action. The Senior Vice President, Nuclear and his management team are convinced that certain of the existing improvement efforts will contribute significantly towards supporting enhanced maintenance and safe operation and should be given greater emphasis and support.

As stated previously, continued and strengthened commitment is being made in the areas of configuration management, training program enhancements and maintenance program improvements. In addition to those critical activities, the "new" management team is also advocating greater emphasis to past TED commitments regarding the establishment of site-wide procedures, and the achievement of compliance with applicable Appendix R and other fire protection requirements.

As discussed in Section II.B.2, all open PEP and SALP activities have been appropriately dispositioned.

II.B.2. - Incorporation of Existing Performance Improvement Programs

Introduction

Item III.C of the enclosure to the NRC letter to Toledo Edison dated August 14, 1985 specified a concern regarding: "Adequacy of the implementation of the Performance Enhancement Program (PEP) and any other ongoing corrective action programs."

PEP consisted of interim or short-term actions, which are largely complete, and longer-term Action Plans. The other major corrective action program that Toledo Edison had substantially underway was a SALP improvement program, initiated in response to NRC's Systematic Assessment of Licensee Performance (SALP) 4 Report.

As stated previously in section II.B.1 of this report, both of these programs (i.e. PEP and SALP) have been included in an overall reassessment of Toledo Edison's corrective action/performance improvement programs. The reassessment was undertaken to:

1. Identify and describe all PEP and SALP concerns or commitments.
2. Reassess each item to determine its current applicability and priority for accomplishment.
3. Assure resources needed to accomplish the action exist.
4. Prepare a revised schedule for performance of the specific activities.

The results of this reassessment are discussed below:

Performance Enhancement Program Activities

The original PEP Interim Actions Program contained 159 items. As of July 31, 1985, 16 items were still open. Based upon the reassessment of these items, seven items were assigned to be completed on a priority basis, while the other nine items were assigned to specific line organizations for implementation as part of their normal operation. Appendix B.2.1 contains the PEP Interim Actions and identifies how they were dispositioned.

As of July, 1985, 45 PEP Action Plans were being implemented. Based upon the reassessment, eleven of the plans were designated as high priority to which maximum emphasis and resources will be applied; seven plans were determined to be nearing completion and would be completed as planned; 27 plans were determined to be the responsibility of line management organizations and would be expected to be accomplished in the due course of business consistent with the new management program. Appendix B.2.1 identifies the 45 PEP Action Plans and how they have been dispositioned.

SALP Improvement Program Activities

At the time the reassessment of the SALP activities was performed, 66 items were considered still open. Based upon the review of these items, it was determined that 56 of the activities were on the existing Licensing Commitment Tracking System, and will be completed per the existing schedule. Appendix B.2.1 identifies how the remaining 10 items will be dispositioned.

II.B.3 - Maintenance Improvement Program

Introduction

It is recognized that excellent performance in the conduct of maintenance is a necessary prerequisite to achieving and sustaining excellent plant performance. Both TED and the NRC have identified the need to improve the maintenance program at Davis-Besse. TED is aggressively taking action to improve performance in the area of maintenance. The maintenance improvement program represents a long-term commitment intended to assure increased reliability and improved performance of the equipment at Davis-Besse. The improvement program is addressing several broad areas as listed below:

- Organization
- Administrative and Technical Procedures
- Training
- Preventive Maintenance
- Spare Parts and Materials Control
- Engineering Interface and Support
- Plant Cleanliness and Material Readiness
- Facilities

Item III.B. of the enclosure to the August 14, 1985 NRC letter identified a concern regarding:

"Adequacy of the maintenance program, including maintenance backlog, maintenance procedures and training, vendor interface and correction of identified deficiencies."

A review has been made of all open Maintenance Work Orders (MWO) resulting in all MWO's being scheduled according to their priority. As new MWO's are generated they are assigned a priority and included in the overall schedule for performing maintenance work.

The review of backlogged MWO's, coupled with the significant maintenance program improvements described below, provides assurance that all important maintenance activities will be properly and promptly performed.

Following is a discussion of the improvements being made in each of the areas identified above.

Reorganization of Maintenance Department

The Maintenance Department has been reorganized (see Appendix B.1.1) and personnel changes to strengthen its capability have been made. New senior management personnel with extensive maintenance management experience have been hired and currently occupy the positions of Assistant Plant Manager - Maintenance, Instrumentation and Controls Superintendent and Mechanical Maintenance General Foreman. These new individuals bring a broad background of nuclear maintenance experience to Davis-Besse. The Maintenance Department has been restructured to bring increased supervisory attention to the performance of maintenance activities in the plant. Each discipline in the Department now has assigned a Superintendent, a General Foreman, a Lead Engineer, and several Foremen.

Previous supervision to craftsmen ratios averaged one supervisor to 23 mechanical craftsmen, one to 26 electrical and one to 19 I&C craftsmen. In the new organization, the supervisor to craftsmen ratios have been improved to one supervisor to 10 mechanical craftsmen, one to six electrical and one to seven I&C craftsmen. A major objective of the reorganization is to assure that sufficient supervisory manpower is available to manage the paperwork and still directly supervise plant maintenance activities.

To ensure that the benefits of this new organization are brought fully to bear on maintenance of the plant and that sufficient communication occurs, the Assistant Plant Manager, Maintenance, meets regularly with all members of the Maintenance staff; daily with Superintendents and General Foremen; monthly with the entire section of each discipline, and quarterly with the entire Maintenance Department. The Assistant Plant Manager, Maintenance, also communicates daily with the Plant Manager and the Assistant Plant Manager, Operations.

Administrative and Technical Procedures

Maintenance Department administrative and technical procedures will be subjected to a major upgrade program. This concentrated upgrade effort is scheduled to commence during September 1985 and will be completed by December, 1986. To expedite this effort, professional procedure development assistance has been obtained from organizations experienced in this field.

The major objectives of the procedure upgrade program will be to:

- Incorporate guidance in administrative procedures derived from the NRC, INPO and other pertinent industry practices.
- Incorporate previous maintenance experience in technical procedures.
- Establish better defined administrative and work controls for plant maintenance activities.
- Assure that formalized feedback mechanisms are established that will improve the quality and accuracy of the technical procedures as more experience is gained.

Currently, emphasis is being placed on the improvement of the quality of Maintenance Department technical procedures. The new maintenance organization has established technical positions within each discipline that are directly responsible for the content and accuracy of these procedures. Additionally, new procedures and revisions to existing procedures are being "walked through" by experienced craft personnel, prior to approval, to assure their useability. In those cases where vendor instruction manuals are being used directly to support maintenance activities, each manual must receive a technical review by the discipline technical staff, and be approved prior to each use. This activity is being documented in the work package for each activity. This procedure will be applied to vendor technical manuals until configuration management controls are established which accomplish the same purpose.

Training

To assure that the Maintenance Department places increased emphasis on training, one foreman in each discipline has been designated as the "Training Foreman." This foreman is responsible to assure that adequate training is provided, training schedules are developed and adhered to, and that personnel are successfully participating in the training program.

The Maintenance Department is adopting the "Training Shift" concept to assure that designated individuals are assigned for specific lengths of time totally devoted to training. The schedule for having maintenance training programs ready for INPO accreditation is being accelerated from the end of 1986 to as close to mid-1986 as possible. To assure that the training program recognizes the needs of maintenance craft personnel, Training Councils have been formed in each discipline. The Training Council consists of craft representation, in a ratio of one craftsmen on the council to 10 craftsmen in the discipline along with the Training Foreman and the appropriate supervisor from the Training Department. The Training Council makes recommendations to the Assistant Plant Manager, Maintenance and the Training Director in all areas concerning the type of courses to be taught, the quality of course material, and training schedules.

Preventive Maintenance

The program for Preventive Maintenance is being subjected to improvements from several perspectives. The newly formed Nuclear Plant Systems Department has been assigned responsibility for review of selectedplant systems. Results of the review will be used to improve the quality and effectiveness of the preventive maintenance program. Ongoing reviews of the results of testing, corrective maintenance, and preventive maintenance will provide additional information to upgrade the preventive maintenance program. To facilitate the incorporation of improvements to the Preventive Maintenance Program, the services of professional consultant personnel are being obtained from B&W, Bechtel, and several other experienced organizations. As discussed previously, a central planning organization independent of the maintenance organization has been established to develop and implement an integrated plant maintenance and modifications schedule. In order to assure Preventive Maintenance is completed in a timely manner, the schedule will assign higher priorities to the performance of Preventive Maintenance. The schedule will also ensure that a coordinated approach is used to complete preventive and corrective maintenance activities.

Spare Parts and Materials Control

A program for upgrading spare parts and materials control has been developed and is in the process of implementation. Specific aspects of the program which deal with spare parts adequacy and the inventory control system are being expedited. Aggressive implementation of this program coupled with the hiring of the Materials Manager (see Section II.B.1) will assure improved material resources are available to support plant maintenance activities.

Engineering Interface and Support

To assure the adequacy of communications between the Engineering Division and the Maintenance Department, an administrative procedure has been developed which:

- Assures that identified concerns will be formally elevated to appropriate levels of engineering and management for resolution.
- Requires the integrated plant schedule to list all concerns with a required response date.
- Identifies the individual responsible to provide a resolution, and the individual responsible to implement the resolution.

This procedure is currently undergoing formal review and comment resolution with issuance scheduled for September 30, 1985. Implementation of this procedure will significantly enhance engineering support of maintenance.

Plant Cleanliness and Material Readiness

A continuing program to improve plant cleanliness and material readiness has been established. This program has several features. The first is a composite (mechanical, electrical, I&C) crew of maintenance craftsmen under a supervisor reporting directly to the Assistant Plant Manager, Maintenance. The crew is devoted to a systematic, room-by-room, level-by-level walkdown of the plant. The crew is responsible for repairing minor problems, identifying larger maintenance action items, initiating work requests, and establishing schedules and priorities for a dedicated cleaning staff assigned to the crew.

A second feature of the program has been the assignment of daily plant inspection responsibilities to each member of the Maintenance Department management and staff. Each individual has a specific area of the plant which he must inspect daily. Guidance has been provided to the individuals as to what specifically to inspect for. Essentially, each individual is looking for deficiencies related to his particular craft. Deficiencies are documented on Work Requests. Cleaning items are placed on punchlists which are routed to planning and scheduling, or to the composite clean-up crew. Inspection schedules are being rotated on a monthly basis to assure that the entire plant is inspected in this manner every six months.

The requirements of the above programs are being incorporated into a new procedure entitled "Conduct of Maintenance," being developed by the Assistant Plant Manager, Maintenance. The procedure will formally establish management policies concerning the duties and responsibilities of all Maintenance Department personnel and give specific guidance as to the overall goals and objective of the Maintenance Department. The current schedule for approval and issuance of this procedure is October 15, 1985.

Maintenance Facilities Improvements

To enhance the performance of station personnel, a new Personnel Support Facility (PSF) is being constructed. The PSF provides 100,000 sq. ft. of shop and office space. The PSF incorporates the following features:

- State-of-the-art shop equipment which will significantly improve shop repair capabilities.

- A "functional" arrangement of organizations and personnel to provide more efficient handling of Work Orders and Work Packages. This feature brings into close proximity the organizations which require a high level of interface and direct communications. This reduces time lag and promotes efficiency in the processing of all paperwork associated with operating and maintaining Davis-Besse.

- Improved working and office conditions for all staff personnel. This feature will have a significant impact on raising the morale of plant personnel and will help to install a high sense of pride in Davis-Besse and its equipment.

Ground breaking for the new facility took place on September 5, 1985. Preliminary work is already underway to install underground piping and electrical systems and the current schedule requires that the facility be ready for occupancy by November, 1986.

II.C. ACTIONS RELATED TO THE JUNE 9, 1985 EVENT

II.C.1. Event Investigation

Introduction

Items I.A and I.B of the enclosure to the August 14, 1985 NRC letter to Toledo Edison discuss, respectively, the need to complete the investigation of equipment malfunctions and operator errors which occurred during the June 9, 1985 event, and the need to determine the root causes of those malfunctions and errors.

This section discusses the process and methodology applied by Toledo Edison in investigating the June 9 event. Included is a description of the process by which root causes are being determined and possible generic implications are being evaluated. The reports presenting Findings, Corrective Actions and Generic Implications related to equipment involved in the June 9 event are provided in the Appendices to this report. Appendix C.1.1 presents the reports for the items listed on Table 5.1 of NUREG-1154 (Item II.A.11 of the enclosure to NRC's August 14 letter). Appendices C.1.2 and C.1.3 present, respectively, the reports relating to safety-related valves (NRC Item II.A.5) and the reliability of the Pilot Operated Relief Valve (NRC Item II.A.8). Appendix C.1.4 describes the planned confirmatory testing of specific equipment which malfunctioned during the June 9 event.

It should be reemphasized that the content of Appendices C.1.1 through C.1.4 will be updated as the June 9 event investigation reaches its culmination. The final content of these Appendices will completely satisfy the questions raised in the August 14, 1985 NRC letter relative to equipment malfunctions and also support decision-making regarding restart of Davis-Besse.

Background

Following the June 9 event, Toledo Edison initiated an investigation to determine the cause of the equipment failures which occurred. Toledo Edison committed the resources required to conduct a thorough investigation. This investigation was closely coordinated with the NRC Fact Finding Team's evaluation of the event and with NRC Region III personnel. (The NRC Confirmatory Action Letter issued on June 10, 1985 (Ref. 6) specified that work on the equipment involved in the event be held in abeyance until the NRC investigative team could evaluate the event and concur with the proposed actions. Subsequent correspondence (Ref. 7 & 8) clarified how information was to be provided for NRC review and how work was to be controlled). The Toledo Edison investigation has used a four-step process to evaluate each individual instance of anomalous equipment performance. These steps are:

1. Preparation and implementation of an Investigation and Troubleshooting Plan ("Action Plan");

2. Determination of Root-Cause Findings
3. Establishment of Corrective Action and Assessment of Generic Implications
4. Final Resolution and Documentation of Readiness for Restart.

For each step in the process, a formal report (or revision) is prepared, which forms the basis for technical review and assessment of proposed action by Toledo Edison. All of the Investigation and Troubleshooting Action Plans (Step 1) were reviewed with the NRC Fact Finding Team prior to implementation. All of the Findings, Corrective Actions and Generic Implication Reports are included in Appendices C.1.1 through C.1.3 to this report which will be updated as new reports are issued.

The Toledo Edison investigation has been performed by specific Toledo Edison and contractor personnel assigned to Action Plan Teams for each piece of equipment which was involved in the event and which was included in a "Freeze List" agreed upon between Toledo Edison and the NRC Fact Finding Team. In addition, a specific team was assigned to investigate the operating procedures and operations-related activities associated with the event. (See Section II.C.4 for a discussion of this investgation and its findings.)

The Toledo Edison investigation has been conducted in accordance with detailed guidelines. These provide for oversight by an internal Task Force of four members. The Task Force reviews all of the reports from the perspective of the technical content and the bases for any stated conclusions. Actions are not considered complete until the Task Force has approved the related report.

Investigation and Troubleshooting

Table II.C.1.1 presents a list of the equipment which failed or operated in an anomalous fashion during the event. This list represents the "Freeze List" which was agreed upon between Toledo Edison and the NRC Fact Finding Team. Each equipment item on this list was the subject of an Action Plan.

Action Plans were reviewed by the NRC Fact Finding Team prior to release for field related troubleshooting or testing. Each Action Plan followed a similar format. Troubleshooting and investigative activities were preceded by event evaluation and technical analyses.

Analysis and evaluation encompassed the collection and review of operational data covering the period prior to, during and after the transient as well as the maintenance and surveillance testing history of the equipment involved. Vendor engineering support was utilized where needed. From this effort, hypotheses for the root causes of failure or abnormal operation were formulated. The cognizant engineer(s) assigned to the particular Action Plan then developed plans for testing of the hypotheses either through checks, verifications, inspections, trouble-shooting, or equipment operational testing.

TABLE II.C.1.1

ACTION PLAN SUMMARY INDEX

ACTION PLAN	TITLE	NUREG 1154 Table 5.1 Item No.*
1A/1B	Auxiliary Feed Pump Overspeed Trips	4
1C	Auxiliary Feed Pump Manual/Auto Essential Control Problem	4
1D	Auxiliary Feed Pump Turbines Overspeed Trip Throttle Valve Problems	10
5/6/7	Steam and Feedwater Rupture Control System Trip/Main Steam Isolation Valve Closure	2
8	Main Feed Pump Turbine Control System	1
9	Turbine Bypass Valve 2-2 (SP13A2) Problem Analysis	14
10	Review of Operation of the Pilot Operated Relief Valve (PORV)	8
12	Auxiliary Feedwater System Valve Problem Analysis (AF-599 and AF-608)	5
15A&B	Source Range Detectors NI-1 and NI-2 Inoperabilities	7
16	Main Steam Header Pressure	3
18	Startup Feed Valve SP7A Problem Analysis	9
26	Inadvertent Auxiliary Feedwater Pump No. 1 Suction Supply Transfer From Condensate Storage Tank to the Service Water Supply	11
27	Auxiliary Feed Pump Turbine Main Steam Inlet Valve MS-106 problem Analysis	6

* Numbers are the corresponding item number from Table 5.1 of NUREG-1154. Items 12, Turbine Turning Gear, and 13, Control Room HVAC, were not included on the Equipment Freeze List, nor evaluated as part of the Toledo Edison investigation. Exclusion of these items was done with the concurrence of the NRC Fact Finding Team.

Guidelines also were developed and followed to ensure that the field performance of investigations did not result in the loss of information due to disturbance of components or systems. These guidelines are intended to preclude actions which might prevent finding the root cause of the failure.

The significant features of these guidelines are:

- All Action Plans for troubleshooting and investigative work were reviewed with NRC personnel prior to implementation.
- Only activities required by the reviewed and approved Action Plan can be conducted on Equipment Freeze List components unless such activities are: a) required for plant safety, or b) required by Technical Specifications.
- All Maintenance Work Orders (MWO's) relating to the investigation are handled as Nuclear Safety Related.
- Troubleshooting activities and repair activities must be accomplished on separate MWOs.
- MWOs must be approved by the Action Item Lead Individual and reviewed by QC for hold and witness points prior to their implementation.
- Only current drawings and controlled vendor manuals are used.

- The MWO must clearly document the scope, affected equipment, and the desired objective of the investigative activity.

- The sequence of activity must be documented on the MWO, or according to procedures specified in the MWO.

- All as-found conditions must be documented on the MWO. Visual inspections must be conducted and the MWO must document any missing, loose or damaged components.

- When unexpected conditions are noted during the investigation, work must be stopped and the Action Item Lead Individual must be notified. Documentation of the deficiency is required. The Lead Individual must sign off on the discrepancy prior to continuing the investigation.

- The results of the investigation must be documented on the MWO.

- No equipment can be shipped off site without prior approval of Nuclear Facility Engineering and Quality Assurance.

- All failed or removed components/equipment are required to be retained for ongoing review and examination. Complete traceability will be maintained.

Root Cause Findings

The results of investigation and troubleshooting activities are evaluated to determine whether the root cause of the failure or abnormal operation can be definitively ascertained. Following this evaluation, a root cause findings report is prepared. The root cause findings report documents analyses performed, field actions taken and significant findings.

If the investigation requires additional actions or testing, the planned additional activities are described in this report. When a root cause is identified, then a technical justification of findings is included.

Corrective Actions and Generic Implications

The Corrective Actions and Generic Implications are added to the root cause Findings Reports to describe proposed corrective actions that are required to resolve the anomaly and have the equipment or system ready for return to operable status. Corrective actions can include repairs, modifications, procedure changes, training, testing and other necessary actions. Action plans are prepared to support implementation of corrective actions. The generic implications of the findings to other similar equipment, systems or situations is documented for review, with details provided as to the scope of the equipment considered. Where generic corrective actions are known, such corrective actions are included in the report.

Summary of Activities Taken

The Findings, Corrective Actions, and Generic Implications Reports for equipment included on the Freeze List are contained in Appendices C.1.1 through C.1.3 to this report. For convenience, the Freeze List equipment has been grouped in a manner consistent with the concerns detailed in the enclosure to NRC's August 14, 1985 letter. Equipment items which are separately listed in the NRC letter are described in separate Appendices. Thus, the Appendices cover:

Appendix C.1.1	Equipment Items in NUREG-1154 Table 5.1 not separately addressed (Item II.A.11 of the enclosure to NRC's August 14 letter)
Appendix C.1.2	Reliability of AFW containment isolation valves and other safety related valves (Item II.A.5).
Appendix C.1.3	Reliability of the PORV (Item II.A.8)

Revisions to the Appendices of this report will include new Findings, Corrective Actions and Generic Implications Reports as they are changed due to ongoing investigative activities.

Appendix C.1.4 describes the confirmatory test program that Toledo Edison proposes to perform during restart power ascension of Davis-Besse. This program is intended to assure that the corrective actions implemented relative to equipment which malfunctioned during the June 9 event have achieved their intended purpose of correcting the identified concern. This confirmatory test program is one component of the overall restart program that Toledo Edison will be implementing. Other components of the test program are discussed in Section II.C.7 and its associated Appendices.

II.C.2 - Decay Heat Removal Reliability Improvement Program

Introduction

The June 9 event involved several systems whose safety function is to remove decay heat. The importance of these issues led Toledo Edison to immediately implement a program to improve the overall reliability of decay heat removal at Davis-Besse. A Decay Heat Removal Task Force (DHRTF) was assembled to review all the systems related to decay heat removal including, but not limited to, those which were involved in the event. The task force was chartered to recommend actions which would improve the overall reliability of decay heat removal systems.

Item I.C. of the enclosure to NRC's August 14, 1985 letter to Toledo Edison identified the need for corrective actions to assure the reliability of systems which can mitigate loss of feedwater events. Several other items in the enclosure also address concerns related to decay heat removal. These items and the issues they relate to are: II.A.7, AFW system including the need for a diverse pump; II.A.10, Startup Feed Pump (SUFP) Operating Restrictions; and II.B.3, Plans for installing a new pump to replace the present SUFP. These concerns were addressed by TED's Decay Heat Removal Task Force.

Item II.B.2 of the enclosure to the NRC letter relates to programs to minimize the likelihood of inadvertent isolation of AFW. This concern relates specifically to the Steam Feedwater Rupture Control System

(SFRCS) which is also the subject of Item II.A.2. This system was also considered as part of the Decay Heat Removal Task Force program.

Background

To respond to concerns arising from the June 9, event, a Decay Heat Removal Task Force (DHRTF) was formed. The Task Force reviewed the design and operational features of the Davis-Besse Station for removing decay heat from the reactor coolant system. This included the Auxiliary Feedwater System, proposed Motor Driven Feed Pump, Steam Feedwater Rupture Control System (SFRCS), and Primary System Feed and Bleed capabilities.

The Task Force has recommended improvements to increase the reliability and operability of design features used for decay heat removal at Davis-Besse. In addition, the Task Force provided recommendations for reducing the complexity of SFRCS and simplifying its operation.

The Task Force was comprised of Toledo Edison personnel with specific Davis-Besse engineering and operations experience, and included outside experts with a broad base of experience in nuclear plant design, engineering, and operations. The outside experts included representatives of MPR Associates, Babcock & Wilcox, and Cygna. The Task Force has completed its review and has made recommendations. Those recommendations are now being reviewed in detail to determine if additional analyses are required and to identify appropriate short and long-term actions. The actions that will be taken as a result of this effort to improve decay heat removal reliability and performance of SFRCS are contained in Appendices C.2.1 and C.2.2 respectively.

Task Force Objectives

To achieve substantive improvements in plant reliability, the Task Force set the following specific objectives:

- Reduce the frequency of demands for emergency methods of decay heat removal (i.e., initiating of auxiliary feedwater flow) by assuring continued operation of the normal plant heat removal capabilities (main feedwater and main steam).

- Reduce the number of automatic system responses required to initiate emergency methods of decay heat removal.

- Reduce the potential for common mode failures which could disable means of decay heat removal.

- Evaluate diverse and redundant means of providing decay heat removal.

Task Force Approach

To achieve the above objectives, the following Davis-Besse plant design features for removing reactor decay heat at operating temperature and pressure were evaluated by the Task Force:

- Decay Heat Removal via Steam Generators (Secondary System Cooling)

  This is the normal, and preferred, method of removing decay heat. The Task Force review was directed at ensuring a source of feedwater to the steam generator via the:

  1. Main Feedwater and Main Steam System
  2. Auxiliary Feedwater System
  3. Motor Driven Feed Pump

  This included identifying improvements to the Steam Feedwater Rupture Control System (SFRCS) to reduce the frequency of main feedwater, auxiliary feedwater, and main steam isolation, and to reduce the overall SFRCS complexity.

- Feed and Bleed Cooling (Primary System Cooling)

  This is a backup method of decay heat removal which includes heat removal from the reactor core using high pressure reactor coolant makeup (through high pressure injection or makeup pumps) with energy removal through the Pilot Operated Relief Valve or pressurizer code safety valves.

For each of the Task Force objectives, specific existing design features and capabilities were reviewed and alternative design approaches which would provide significant improvements in plant reliability and operability were evaluated. The Task Force used a combination of technical evaluations, preliminary scoping calculations, and engineering judgement in evaluating each alternative. More specifically, the following were considered:

- Plant design documentation including the FSAR, Mechanical, Electrical, and Control System Diagrams, Vendor Technical Manuals and related information as necessary

- Applicable plant operational experience including the June 9 event

- Interviews with Toledo Edison personnel cognizant of specific system and equipment design features and operation

- Interviews with senior plant operators regarding plant operation and response

- Scoping calculations and design comparisons with other plants as required to assess the feasibility and acceptability of alternatives

- Reliability analyses to assess relative improvements expected to be achieved for design improvements specifically related to the auxiliary feedwater system. This was done using existing Probabilistic Risk Assessment (PRA) models for this system.

Summary of Recommendations/Activities

As a result of the Task Force efforts, Toledo Edison has identified plant modifications and operational changes to improve the reliability of decay heat removal which should be pursued in the short term. This includes installation of the new Motor Driven Feed Pump. The implementation of the short term Task Force recommendations relating to AFWS will result in an order of magnitude improvement in AFWS reliability. Additionally, the installation of the MDFP will improve AFWS reliability by another order of magnitude. Other additional modifications and operational changes have been identified for long term implementation. In determining this course of action, current NRC requirements and guidance, including the General Design Criteria, Standard Review Plan, and applicable design standards, were considered.

The Task Force review resulted in specific recommendations for improvements to Davis-Besse systems. Recommendations relating to decay heat removal systems which have been approved and scheduled for implementation are detailed in Appendix C.2.1. Recommendations relating to SFRCS which have been approved and scheduled are described separately in Appendix C.2.2. This separate treatment is solely for convenience since SFRCS concerns were identified in a specific item of the enclosure to NRC's August 14 letter (Item II.B.2). The SFRCS recommendations were arrived at, reviewed, and approved in the same manner as those detailed in Appendix C.2.1.

A probabilistic evaluation of AFWS reliability, including the effect of the modifications being made, is described in Appendix C.2.3.

Technical evaluations are continuing, and may result in the identification of enhancements beyond those already described in Appendices C.2.1 and C.2.2.

II.C.3 Analysis Program

Introduction

Item II.A.1 of the enclosure to NRC's August 14, 1985 letter to Toledo Edison identifies a concern regarding

> "The adequacy of the analyses for loss of feedwater events, including time margins and consequences of alternative sequences."

In addition, item 5 of NRC's Confirmatory Action Letter to Toledo Edison, dated June 10, 1985, required in part:

> "An evaluation of the thermal shock considerations for both Steam Generators" and "the maximum S/G shell differential temperature."

Toledo Edison has instituted an analysis program which addresses these concerns. That program is discussed in this section. Items II.A.2 and II.B.4 of the enclosure to NRC's August 14, 1985 letter to Toledo Edison also identified, in part, a concern regarding "single failures" as they might relate to the Steam Feedwater Rupture Control System (SFRCS) and other safety systems. That concern is also addressed in this section.

Capability to Mitigate Loss of Feedwater Events

Analyses performed by Toledo Edison in 1979 and 1981 verified the procedural adequacy of decay heat removal via the safety grade auxiliary feedwater system as well as by an "equivalent third pump" method. The latter utilized a combination of primary and secondary side cooling using the startup feedwater pump, one makeup pump and the Pilot Operated Relief Valve (PORV). These analyses formed the basis for the procedures used to successfully mitigate the June 9 event.

As a result of the June 9 event, Toledo Edison commenced additional analysis efforts. These analyses evaluated the ability to remove decay heat from the reactor core via the secondary and/or primary systems. These analyses have been focused on:

- Demonstrating the adequacy of plant response under loss of all feedwater conditions, including time margins available for alternative actions.

- Benchmarking of the analytical code utilized.

- Evaluation of desirable system and procedural improvements.

The capability of the Davis-Besse Plant to perform Makeup/HPI feed and bleed cooling of the RCS following a complete loss of feedwater (LOFW) event has been particularly scrutinized. The analyses performed established bounding "best estimate" responses of the Davis-Besse Plant to a LOFW event. Different times for operator action were assumed in an effort to provide results that would allow the evaluation of a range of initiating conditions which could be used to identify possible procedural improvements. Results of the analyses demonstrate that, with the use of existing plant equipment and timely operator action, feed and bleed cooling can be successfully employed at Davis-Besse to prevent core uncovery following a complete LOFW event. The analysis results are further described in Appendix C.3.1.

It should also be noted that the NRC Staff, in a presentation to the ECCS Subcommittee of the Advisory Committee on Reactor Safeguards on August 27, 1985, reported preliminary results of their own analytical work which agreed with TED's conclusions.

Effect of the June 9 Event on Plant Components

Toledo Edison requested B&W to evaluate the effect of the June 9 transient on the Davis-Besse steam generators. This evaluation is reported in B&W Document Number 32-115858300 "Davis-Besse Transient (6/85) - OTSG Structural Integrity" which is provided in Appendix C.3.2 of this report. In examining the transient relative to structural adequacy of the Once-Through-Steam Generators, loads on the following portions of the OTSG were investigated:

- Auxiliary Feedwater Nozzle
- Main Feedwater Nozzle

- AFW Jet Impingement Tube Stress
- Thermal Shock on Lower Tubesheet
- Axial Compressive Load in Tubes Due to Shell to Tube Temperature Difference.

The results of this evaluation show that the June 9, 1985 transient had no adverse structural effect on the steam generators. The report of this evaluation is included in Appendix C.3.2.

These results are consistent with the component Functional Specification CS(F)-3-92/NSS-14, which identifies initiation of feedwater to a dry OTSG as a transient with 20 cycles acceptable. B&W indicates that additional cycles may be shown to be allowable. Davis-Besse has recorded four such transients: 12/78, 3/79, 3/84 and 6/9/85.

The cooldown rate of 50° in six minutes that occurred during the June 9 event, is also bounded by the OTSG functional specification. The refill transient analysis uses a 40° drop in one minute. The long term cooldown rate on June 9 was within the specified 100°/hour.

Secondary chemistry remained within specifications, even though AFP pump suction was briefly taken from service water. This is based on sampling done immediately after the event.

Evaluation of the effects of the June 9 event on the Reactor Vessel is included in Appendix C.3.2.

Single Failure Susceptibility of the AFW/SFRCS

NUREG 1154 (Ref 4) and item II.A.2 of the enclosure to NRC August 14 letter raised concerns regarding single failure protection of the AFW/SFRCS actions relating to the Auxiliary Feedwater Containment Isolation Valves (AF 599 and 608).

The particular concern over single failure comes into play during a Main Steam Line Break situation upstream of one of the MSIVs (see Figure 1). This results in the unavailability of that steam generator for cooling. Both pumps are aligned by SFRCS to feed the intact steam generator. However, if both generators depressurize below the SFRCS setpoint for actuation on low steam generator pressure, the perception would be that the AFW containment isolation valve to the intact generator (AF599 or 608) would go shut. It would then require reopening to provide auxiliary feed to the steam generator. The failure of this one valve to reopen is then, the single failure in question.

Specific analyses were run for Main Steam Line Break accidents and documented in the Davis-Besse Final Safety Analysis Report. These include one analysis in section 15.4.4 of the body of the report as well as one analysis in response to NRC Question 15.4.8 (this already includes a single failure). Both of these analyses were completed prior to the end of 1975. To maximize offsite consequences of this event, assumptions and techniques utilized in the simplified analyses were designed to specifically challenge core thermal limits. This was done by maximizing the amount and duration of the blowdown of the generators. This blow-down caused a high Reactor Coolant System cooldown rate which resulted in the worst core thermal conditions. Single failures were discussed in this initial licensing activity that would worsen the core thermal conditions and are basically inappropriate for the detailed evaluation of the AFW system issue raised in NUREG 1154.

To review the vulnerability of single failure of the AFW system response, the issue is whether the affected steam generator will isolate before a Main Steam Line Break (MSLB) would depressurize the intact generator and close its AFW containment isolation valve. MSLB and AFW/SFRCS single failure was a particular issue in response to NRC question 10.3.6 (FSAR, page 10.36-1). Single failure discussions for SFRCS and AFW were provided in the original licensing process. The resolution of these questions implies that the second AFW valve would not be expected to isolate. However if this specific question would have been raised during the initial licensing action, the issue would probably have discussed the following :

1. The valves AF 599 and 608 themselves have double motor starters installed. This addresses the issue of one valve inadvertently going closed when it is the only flow path to the intact steam generator. This single failure concern was specifically

reviewed and resolved during the original licensing process and documented in the NRC Safety Evaluation Report (Ref. 10) Related to Operation of Davis-Besse (NUREG 0136) Supplement 1, Section 7.4.1 pg. 7-5.

2. Steam line non-return valves installed down stream of the MSIV's limit the effects of a steam line rupture if it occurs in the auxiliary building or containment structure. During power operation the weight of the valve discs is held open by steam flow. Upon loss of steam flow or flow reversal, the valve discs close rapidly. The closure of these valves and therefore the limiting of energy passing through them were given credit in this licensing process for compartment pressurization analyses.

3. Credit was given in the Steam Line Break case for the closure of turbine stop valves (TSV) as a single failure option to the Main Steam Isolation Valves. (NRC SER for Davis-Besse, NUREG-0136 (Ref. 9), Section 14.2.2, pg. 15-3.). The turbine stop valves receive two trip signals. The first signal comes as a turbine trip following a reactor trip and originates from the Control Rod Drive Control System receiving a trip signal from the Reactor Protection System. A later, second signal to the turbine stop valves is received from the steam generator low pressure trip of the SFRCS and also commands valve closure.

4. The turbine stop valves have a significantly shorter response time than the Main Steam Isolation Valves; <2 second vs <6 seconds

for the MSIVs. If a single failure is being taken elsewhere in the event, the shorter response time of the turbine stop valves would terminate depressurization early.

Prior to return to power Toledo Edison is modifying the SFRCS to disable the second AFW containment valve isolation feature. This single failure is therefore resolved for future operation. Analyses that will be able to more specifically illustrate the applicability of past concerns are being pursued in relation to longer term SFRCS changes and will be provided in Appendix C.3.3 when completed.

Details of the analyses done throughout the FSAR had specific objectives and therefore specific assumptions and techniques for worsening the event. Credit was taken for several equipment components in different portions of the document that could more easily show that the licensing evaluations bound this concern. The specific FSAR discussion and questions relating to AFW and SFRCS would indicate that this need not be considered a single failure potential.

Adequacy of Other Engineered Safety Feature Systems

In light of the single failure vulnerability issue raised for SFRCS, Toeldo Edison is reviewing the Davis-Besse Reactor Protection and Engineered Safeguard Features Actuation System for similar susceptibilities. This action addresses Item II.B.4 of the enclosure to NRC's August 14, 1985 letter. The results are discussed in Appendix C.3.3.

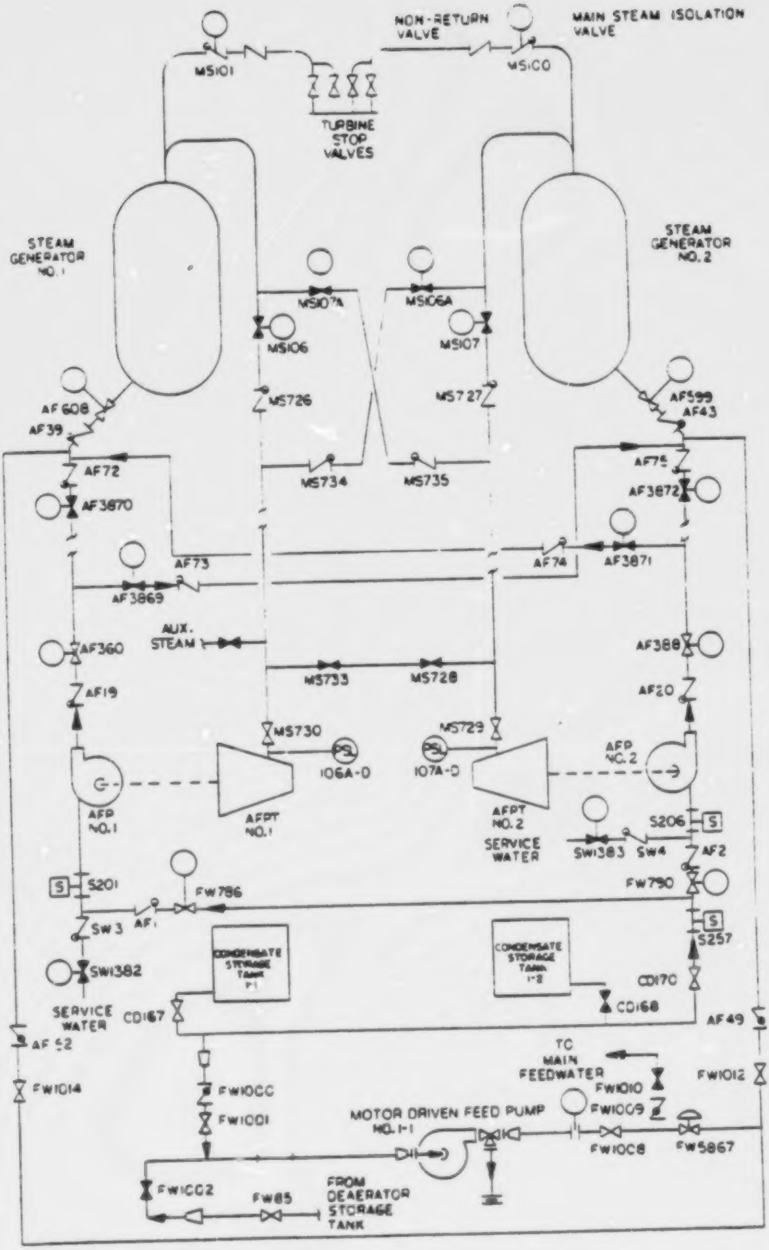
NON-RETURN VALVE
MAIN STEAM ISOLATION VALVE
MS101
MS100
TURBINE STOP VALVES
STEAM GENERATOR NO. 1
STEAM GENERATOR NO. 2
MS107A
MS106A
MS106
MS107
MS726
MS727
AF608
AF39
AF599
AF43
AF72
AF75
AF3870
AF3872
MS734
MS735
AF73
AF74
AF3869
AF3871
AUX. STEAM
AF360
AF388
AF19
AF20
MS733
MS728
MS730
MS729
PSL
106A-D
107A-D
AFP NO. 1
AFPT NO. 1
AFPT NO. 2
AFP NO. 2
S
S201
S206
SERVICE WATER
SW1383
SW4
AF2
FW790
FW786
AF1
SW3
S257
SW1382
CONDENSATE STORAGE TANK 1-1
CONDENSATE STORAGE TANK 1-2
CD170
CD167
CD168
SERVICE WATER
AF52
AF49
TO MAIN FEEDWATER
FW1010
FW1012
FW1014
FW1000
FW1001
FW1009
MOTOR DRIVEN FEED PUMP NO. 1-1
FW1008
FW5867
FW1002
FW85
FROM DEAERATOR STORAGE TANK

FIGURE 1

II.C.4. Review of Operations Procedures and Training

Introduction

The review of the June 9 event indicated that operations personnel performed admirably. Difficulties were experienced, but they did not preclude the prompt restoration of auxiliary feedwater flow. These difficulties did, however, identify the need for an assessment of the event from the perspective of operations procedures, practices and training.

Several of the items in the enclosure to NRC's letter to Toledo Edison of August 14, 1985 also discussed operational procedure concerns. These included Item II.A.3 regarding potential adverse effects of plant physical security and administrative features on operator actions; Item II.A.6 concerning the adequacy of procedures and training for reporting events to the NRC Cperations Center; Item II.A.12 concerning the adequacy of procedures including determination that provisions calling for "drastic" action are clear and precise; and, Item II.B.1 concerning the adequacy of procedures, equipment and training for starting or restarting equipment for mitigating a loss of feedwater event.

Toledo Edison has conducted a review of the operational implications of the June 9 event, which included the considerations raised by the NRC. That review, and the resulting actions, are discussed in this section and Appendices C.4.1 and C.4.2. Appendix C.4.1 discusses the actions which will be taken relative to operating procedures and training. Appendix C.4.2 discusses actions related to the effects of physical security provisions on plant operations.

Review Approach

Toledo Edison's review was intended to determine whether operator actions taken during the event were in compliance with existing procedures. It also included verification that the procedures were technically consistent with the latest Babcock & Wilcox Abnormal Transient Operating Guidelines (ATOG). Where concerns were identified, the root cause was determined and recommendations were made to change procedures, hardware, training, or administrative practices as necessary, to address the root cause.

An action plan committee, chaired by the Operations Superintendent, conducted the review. The committee included representatives from Operations, the Technical Section, and the Training Department.

Overall, while recommending some changes and improvements, the committee concluded that operator actions during the event were appropriate and that the procedures were technically correct.

The results of this review are discussed in Appendices C.4.1 and C.4.2 as noted above.

II.C.5. Control Room Improvement Program

Introduction

Item II.A.9 of the enclosure to NRC's letter to Toledo Edison dated August 14, 1985 identifies as a concern regarding "The adequacy of Control Room instrumentation and controls." This section describes what actions Toledo Edison has taken or will take to address this concern.

Background

As a result of the accident at TMI-2, the NRC, in NUREG 0737, required that all plants develop and implement a Detailed Control Room Design Review (DCRDR) program. Toledo Edison, with the assistance of Impell Corporation and Essex Corporation, developed a DCRDR program plan which was submitted to the NRC on June 15, 1983 (Ref. 12). Through the implementation of the program plan, a list of Human Engineering Deficiencies (HED's) was identified, classified and submitted as a summary report to the NRC on June 29, 1984 (Ref. 13). Among the HED's classified as significant were the location and physical arrangement of the Steam Feedwater Rupture Control System (SFRCS) manual actuation pushbuttons and the location of the SFRCS trip reset pushbuttons for the Startup Feedwater Valves (SP7A, SP7B). These deficiencies contributed to the June 9 event. The fact that these had been previously identified in the DCRDR indicates that there is no apparent need to question the DCRDR evaluation process as a result of the June 9 event. The event does indicate, however, a need to reassess the priority and schedule for implementing corrective actions related to the significant HEDs. This reassessment will be accomplished as part of the Systems Review and Test Program described in Section II.C.7 of this report.

As part of the System Review and Test Program, System Review Groups will consider the significant HEDs identified by the DCRDR. All significant generic HEDs will be considered as well as the specific HEDs related to systems being reviewed under the program. Each HED reviewed will be assessed to determine whether correction is required in the short-term, i.e. prior to restart, and these will be resolved. Remaining HEDs, those not requiring pre-startup resolution, will be addressed as part of the continuing implementation of the DCRDR program.

With respect to the significant HEDs which affected the course of the June 9 event, appropriate compensatory or corrective actions will be implemented prior to restart. The SFRCS Manual actuation switches will be rearranged consistent with appropriate human factor considerations prior to restart. In addition, guards will be installed over the switches which are used most infrequently. The new arrangement has been reviewed for human factors considerations. In the new arrangement, low steam generator pressure actuation switches for a given channel will be in the same relative location in each column of switches. Thus, an operator will no longer have to actuate the first switch in one column and the second switch in the other column (for example) to manually initiate actions for low pressure in one steam generator. In the longer-term, changes to the SFRCS logic are expected to reduce the total number of switches to four, which will then be relocated to the SFRCS panel.

The other major control room design problem experienced was related to the pushbutton arrangement for the startup feedwater valves used when aligning the Startup Feedwater Pump. This problem is no longer considered relevant since the new motor-driven feed pump will be aligned differently and any operational considerations related to use of the new pump are being considered as part of the design process.

One change not identified in the DCRDR will be made. Based upon experienced gained from the June 9 event, the PORV position indication, currently located on the Post-Accident Monitoring Panel (PAM), will be duplicated at a position adjacent to the PORV control switch. This will provide an improvement in the currently acceptable PORV position indication and allow the operator to better monitor PORV position.

II.C.6 Shift Technical Advisor

Introduction

Item II.A.4 of the Enclosure to NRC's letter to Toledo Edison dated August 14, 1985 identifies as a concern: "The availability of and role for the Shift Technical Advisor assistance during complex operating events." This section describes changes which have been made to address this concern.

Background

Prior to and including June 9, 1985, Shift Technical Advisors (STAs) at Davis-Besse stood 24 hour shifts. For part of their shift, the STAs used sleeping facilities in the Davis-Besse Administration Building (DBAB). The DBAB is located on the Davis-Besse site, but outside the protected area. During the June 9, 1985 event, the STA had to drive approximately one-half mile to reach the plant. The STA arrived in the control room within 10 minutes of being notified of the trip.

Immediate Actions

The rotation of STAs has been modified such that the duty is now carried out in 12 hour shifts rather than 24 hours. The STA now spends his entire shift within the protected area and has an office within 1-2 minutes of the Control Room. This assures that the STA is immediately available to the control room and would be immediately knowledgeable of plant conditions.

As part of the Performance Enhancement Program (PEP), STAs have been receiving training to give them the degree of knowledge which would be necessary to fulfill the responsibilities of the Emergency Duty Officer. The training will allow the STA to assist the Shift Supervisor in determining appropriate Emergency Action Levels and Protective Action Guidelines. The STA will advise the Shift Supervisor of these conditions; however, the Shift Supervisor will maintain the overall responsibility of Emergency Duty Officer. This training will be completed for all current STAs before restart.

Long-Term Actions

For the long-term, new STAs are being trained who will be assigned permanently to operating shifts. These personnel, presently considered Assistant STAs (ASTAs) were hired in early 1984. They are presently participating in an intensive training program. The program includes both classroom training and practical, on-shift, training in alternating blocks of six weeks each. The program is intended to qualify the ASTAs to take the NRC Senior Reactor Operator (SRO) exam. Continued implementation of this program will include:

- Simulator training for all ASTAs to begin in early September, 1985.

- Additional classroom training.
- A final shift assignment of 5 to 6 months duration to complete practical qualification.
- Additional simulator training.
- NRC SRO examination.

Arrangements are also being made for the ASTAs to obtain practical operating experience at a university reactor. This experience is intended to support their receipt of SRO licenses, since they do not have licensed RO experience. The long-term program will be completed and the new STAs, will be a functioning part of each shift by January 1, 1987.

II.C.7 System Review and Test Program

Introduction

Toledo Edison has established a program to review the history of systems important to the safe operation of the Davis-Besse Station. This review will be performed under the auspices of the Nuclear Mission's Engineering Division. The review is intended to identify problems which may potentially impact the ability of those systems to perform the functions they must perform for safe operation of the plant, to identify the corrective actions necessary to resolve those problems, and to identify any special testing of the system that should be performed during restart power ascension. The program will also review the scope of surveillance testing conducted on those systems to assure they are properly tested.

Background

The June 9 event focused concern on equipment maintenance at Davis-Besse. Equipment problems of a recurring nature contributed to the event. Toledo Edison shares the concern of the NRC regarding assurance of adequate maintenance of all systems and components and the proper identification of the root cause of any such failures. It was concluded, therefore, that it is necessary to evaluate past equipment history to identify significant or recurring equipment problems to assure that the root cause is identified and corrected.

The June 9 event also revealed that the scope of surveillance testing required improvment to assure that the systems would function under a wide range of possible system conditions. Toledo Edison believes that the scope of surveillance testing must be sufficient to assure that the systems will perform their design functions. Finally, the System Review and Test Program activity will also integrate the generic implications information resulting from the event investigation to assure that appropriate consideration is given to these factors in the power ascension test program.

Program Objectives

The objectives of the System Review and Test Program can be stated as follows:

- Evaluate systems important to safe plant operation to identify known significant or recurring maintenance and operations problems and propose corrective actions, where appropriate.
- Implement short-term corrective actions on a schedule consistent with timely restart of the unit.
- Evaluate the scope of existing surveillance test program for each system important to safe plant operation. Identify additional testing required to assure that systems will perform the functions important to safe plant operation.

- Identify testing requirements necessary to verify the adequacy of new system modifications.

- Prepare and conduct a test program to assure that systems important to safe plant operation are fully functional.

Scope of Review

The systems selected for review in this program are those deemed to have the most impact on the safe operation of the Davis-Besse Station. Not all of the systems included in the scope of review are covered by Technical Specifications; and conversely, not all those systems mentioned in Technical Specifications are included in the scope of this review. The systems included in the scope of this review are listed in Table II.C.7.1.

TABLE II.C.7.1

SYSTEM REVIEW AND TEST PROGRAM
SPECIFIC SYSTEMS INCLUDED

Group 1	Reactor Coolant System
	High Pressure Injection
	Core Flooding System
	Decay Heat Removal and Low Pressure Injection
	Containment Spray System
	Containment Emergency Ventilation
	Containment Air Cooling and Hydrogen Control
	Makeup and Purification System
Group 2	Electrical 125/250 VDC (Includes Battery Room H&V)
	Electrical 4.16 KV System (13.8/4.16 KV Transformers)
	Electrical 480 V Distribution (Includes Inverters and Required Transformers)
	Electrical 13.8 KV System (Includes Startup and Auxiliary Transformers)
	Emergency Diesel Generators (Includes "Q" Fuel Oil Tanks and Diesel Room Ventilation)
	Instrument AC Power (Includes Inverters and Required Transformers)
Group 3	Anticipatory Reactor Trip System
	Control Rod Drive Control System
	Incore Monitoring (Includes Core Exit TC)
	Reactor Protection System
	Steam Feedwater Rupture Control System
	Safety Features Actuation System
	Integrated Control System
	Security System

Group 4 Control Room Normal and Emergency H&V Systems
Station and Instrument Air
Station Fire Protection
Component Cooling Water System
Service Water System

Group 5 Auxiliary Feedwater System
Main Steam
Steam Generator System
Main Feedwater System

The system history review will apply to each of the above listed systems. Although surveillance testing, as required by Technical Specifications is not applicable to some of the above systems, periodic testing requirements, as necessary to assure operability of those systems, will be reviewed.

Program Approach

Five System Review Groups have been established to conduct this program. Systems are assigned to each in accordance with the groupings indicated in Table II.C.7.1. The groups consist of Toledo Edison engineering personnel and experienced support personnel from the nuclear industry. For each system, the lead review responsibility will be assigned to a specific Toledo Edison individual. The support personnel are highly qualified industry representatives experienced in system design, operation, and testing.

The groups will conduct a review of past system performance by selected review of available documentation and interviews of Station personnel experienced in the operation, maintenance, and testing of the systems. The review will identify known recurring problems, and the review groups will propose corrective actions as necessary, to resolve those problems. The groups will also review surveillance testing associated with each system to identify and resolve weaknesses in the program.

The results of these efforts will be documented by the System Review Group and then will be reviewed and approved by an Independent Process Review Group. This group is composed of senior Toledo Edison engineering personnel and other top level industry experts operating in accordance with a formal charter.

System Performance Review

A review of past equipment performance requires an examination of historical information on the systems. Such information is available in many different formats. The following types of historical information are being considered:

- Licensee Event Reports (LERs) and Deviation Reports (DVRs). These provide information on the more significant system and component failures. The total number of LERs and DVRs is relatively small, and the information contained in the reports is generally concise.

- Nuclear Power Plant Reliability Data System (NPRDS) reports. There are more of these, but they are somewhat less complete than the LERs and DVRs.

- Maintenance Work Orders (MWOs), the most voluminous source of available information. MWOs document all types of activities. In addition to corrective actions, MWOs are used to document preventive maintenance and contain system modification work.

- Outstanding Facility Change Requests (FCRs). These provide a convenient listing of identified problems and proposed corrective actions. The total number of outstanding FCRs is relatively small, and the information is easily accessible.

- Human Engineering Deficiencies (HEDs) which were developed as part of the Detailed Control Room Design Review program. The HEDs document deficiencies related to the man-machine interface between the operator and control room indications and controls.

- Transient Analysis Program (TAP) Reports. These document the results of post-trip or transient reviews. These reports can be redundant with LERs and DVRs for systems covered by Technical Specifications, but are useful for problems related to systems not covered in Technical Specifications.

- Davis-Besse plant personnel experience is an additional significant historical information resource. Davis-Besse's operating history has been sufficiently short, and the Station staff has been sufficiently stable to provide reasonable assurance that plant personnel are aware of most significant and recurring equipment problems.

The system review program will, to varying degrees, take advantage of all of the above data sources. The information available in LERs and DVRs, outstanding FCRs, HEDs and TAP reports will be examined to identify known equipment problems. To the extent practical, MWOs and NPRDS data will also be reviewed. As a minimum, outstanding MWOs as well as Preventive Maintenance activities will be reviewed. The results of these reviews will provide a basis for questions to be asked during interviews of Station Operations and Maintenance personnel.

The review of documentation and information obtained from the interview process will identify any recurring problems which will be documented.

Corrective Action Generation

Depending upon the significance of the problem, corrective actions may be either short term or long term. The System Review Groups will evaluate each identified problem against an established set of criteria to determine the significance of the problem and whether short term or long term corrective action is required.

For those problems determined to require short term corrective action, proposed resolutions will be developed by the System Review Groups. These actions will be completed prior to restart. Corrective actions for problems slated for long term resolution will be identified after startup.

Short term corrective action may include hardware modifications or procedural changes. In cases where the corrective action may require an unreasonably long time to resolve, compensatory actions will be considered for interim use. Alternative corrective actions will be proposed, where feasible, to allow the most effective to be selected for implementation.

The evaluation of the problems for significance and a description of the proposed corrective actions will be documented in a report which will be presented to the Independent Process Review Group (IPRG). The IPRG will review the problem evaluation and proposed corrective actions. The IPRG will accept or reject the proposals or will recommend alternatives to the proposed corrective actions. Upon approval by the IPRG, the chosen corrective action will be implemented.

Surveillance Test Review

Prior to startup, the System Review Groups will evaluate the scope of surveillance testing that currently exists for their respective systems. The groups will review the testing for completeness and adequacy of testing with respect to design basis conditions. Concerns identified by the group will be documented and proposed test outlines for newly required testing will be created. The results of each system testing review will be forwarded to the IPRG. The IPRG will review the identified concerns and concur with the need for additional testing, if appropriate. The IPRG will evaluate the proposed test outline and conceptually approve the testing as appropriate.

After the newly generated test requirements are conceptually approved, the System Review Group will initiate the development of new or revised surveillance tests which will be processed in accordance with existing procedural programs.

Test Program

In conjunction with the development of new surveillance test requirements, the System Review Groups will develop proposed test outlines for post modification testing on their assigned systems. If testing beyond the scope of the newly modified surveillance test program is required, an outline for a proposed Test Procedure (TP) will be developed. These test outlines will be submitted to the IPRG in the same manner as the surveillance test outlines. Test Procedures will be developed following approval of the outlines by the IPRG.

The new or revised surveillance tests, new test procedures, and other surveillance testing necessary to satisfy Technical Specification operability requirements will be scheduled and conducted in accordance with existing plant testing programs. The results of tests performed on systems will be reviewed by the designated System Review Group. The System Review Group will assume the responsibility for resolution of any identified problems.

III. CONCLUSIONS

Toledo Edison submits that the Course of Action presented in this document provides definitive evidence that corrective actions to resolve previous management and programmatic problems of Davis-Besse have been taken. The new Toledo Edison program assures that necessary management, staff resources, facilities, and management practices exist to establish Davis-Besse as an excellent operating facility.

Toledo Edison's management, both Corporate and Nuclear Mission, are fully committed to this Course of Action. This position, as stated by the Chairman and Chief Executive Officer in his transmittal letter, assures that all actions required to fulfill the Course of Action will be accomplished.

As contained in this document, the results of Toledo Edison's investigation of the June 9 event coupled with the specific corrective actions being taken by Toledo Edison provides assurance that Davis-Besse can be returned to operation, on or about November 1, 1985. In addition, the information presented in this document concerning both the June 9 event and the overall Course of Action provide answers to the concerns raised by the NRC in their letter of August 14, 1985.

Appendix III-1 presents a summary of those actions Toledo Edison intends to take, as detailed in this report. The actions are identified as those which will be accomplished prior to restart and those which are longer term.

Appendix III-2 presents the schedule for major activities to be accomplished prior to restart.

REFERENCES

1. Response to SALP 4 Report, TED to NRC, February 4, 1985 (Serial 1-497)
2. Inspection Report 84-11 (SALP 4 Report), NRC to TED, December 6, 1984 (1-1072)
3. Investigation of June 9 Event, TED to NRC, July 18, 1985 (Serial 1-553)
4. NUREG 1154, Loss of Main and Auxiliary Feedwater Event at the Davis-Besse Plant on June 9, 1985 (Generic Letter 85-13), NRC to TED, July 5, 1985 (1791)
5. NRC Areas of Concern Resulting from June 9 Event, NRC to TED, August 14 1985 (1798)
6. Confirmatory Action Letter 85-06 (CAL 85-06), Loss of Feedwater Flow to Steam Generator, NRC to TED, June 10, 1985 (1183)
7. TED Response to CAL 85-06, TED to NRC, July 1, 1985 (Serial 1-541)
8. Clarification of Item 1 in CAL 85-06, NRC to TED, August 14, 1985 (1-1231)
9. NRC-SER NUREG 0136 (Section 15.2.2, P. 15-3), December 1976
10. NRC-SER NUREG 0136 Supplement 1 (Section 7.4.1, P. 7-5) April 1977
11. Davis-Besse Final Safety Analysis Report (Section 15.4.4, P. 15-104)
12. Update on Detailed Control Room Design Review (DCRDR), TED to NRC, June 15, 1983 (Serial 958)
13. DCRDR Summary Report, TED to NRC, June 29, 1984 (Serial 1057)

Mr. **Eckart**. Thank you, Admiral.

Mr. Bilirakis.

Mr. **Bilirakis**. Thank you, Mr. Chairman.

Admiral, you have made the statement this is a living document. Had it been alive before the June 9 event?

Admiral **Williams**. No, sir. This is the living document in that that document reflects to the NRC on the day of submittal our understanding of the corrective action that was required on the specific issues and the testing that would be done.

We had not completed all of our analysis at that time, and therefore, as we learned more, we kept submitting updates to that document. I just wanted to make sure that you understand that volume two of that document is one that is being updated as we learn more things.

Mr. **Bilirakis**. All right.

Volume 2, which we don't have here, right?

Admiral **Williams**. Right.

Mr. **Bilirakis**. Had there been anything similar to this document or to volume two, which had been in existence as far as the plant was concerned?

Admiral **Williams**. No, sir, and there would not have been because it was an outgrowth of the June 9 event itself.

Mr. **Bilirakis**. This is something you put into effect yourself when you came aboard.

Admiral **Williams**. I did because affirmative action from the NRC required I inform them as to what actions we were going to take in light of the June 9 event to correct the specific problems, and also address the problematic existence that were presented.

That is the source of the document.

Mr. **Bilirakis**. You were hired by the company before June 9?

Admiral **Williams**. Yes, sir. Mr. Williamson first talked to me in April, and I reviewed the reports that NRC had written on the plant, went out to the plant and took a look at it, talked to quite a few of the people, told Mr. Williamson what I thought the problems were, and what the corrective actions were that would be necessary.

Mr. **Bilirakis**. Was this in April, May?

Admiral **Williams**. It went into May, and I gave him my views as to what was going to be required and the magnitude of the job. He agreed with those. All of the programmatic actions that I have taken since I got there really were in the formative stage before the June 9 event occurred.

I didn't sign a contract with them really until June 17, I believe, but I had agreed to go on June 9. I almost reconsidered that.

Mr. **Bilirakis**. They were more anxious to hire you after June 9 probably than they were before. Admiral, I look at this document, obviously we received it this morning and I haven't had a chance to read it, nor will I read it all, but on page 32, there is something called improvement of management practices, and then we go on to reassessment of existing corrective action programs, and then we go on to other portions having to do with basic training and that sort of thing.

You are a management expert. Weren't many of these areas in terms of training and management practices basic? Aren't they so basic and so fundamental that they should have been in effect prior to the June 9 event taking place?

Admiral **Williams**. In my opinion, they are so fundamental they ought to be in effect. But to not be in effect has been endemic in the nuclear industry. It varies from the very bad to the very good these days.

So, it is not unusual to find this kind of a management system in place in the nuclear side of a company that also has been used to running fossil plants for all of their existence.

Mr. **Bilirakis**. I can't say that I am the best manager in the world. I guess I am not. But I have taken an awful lot of management courses, particularly in the service as an enlisted man, and so many of these things are basic that I am just flabbergasted that they weren't a part of the overall operation, and apparently they weren't a part of the overall operation until after this event took place, after you apparently had decided to get them implemented.

That is sort of shocking, particularly since we are talking about a nuclear plant. The burden on a nuclear plant is considerably or certainly should be considerably larger, considerably higher than a fossil plant, as you referred to it.

I commended the NRC a moment ago, mostly because of the difficulty of their job, I suppose, more so than maybe the merit of some of their accomplishments, but it is fundamental that we exercise a higher burden as far as nuclear plants are concerned.

Otherwise, we are going, the industry is just going to get hurt, and possibly be eliminated if we don't awaken to all of these problems.

Well, Admiral, I don't want to put you on the spot as far as that is concerned. They are your employers now, but I will ask you one question and probably take up the rest of my time.

What is the worst that could have happened as a result of the unanimous consent incident? What is the worst that could happened? Apparently, it wasn't corrected, but it was shut off after 12 minutes' time.

But what is the worst that could have happened? I understand there has been some acknowledgment, that there has been some operator error. What if that operator error had not been corrected within 12 minutes' time and it had taken 24 minutes, for instance, or 36 minutes or whatever the case may be?

Admiral **Williams**. Then at some point in time, you would have been relying on the containment to protect the public from radioactivity.

Let me back into that a little bit.

Mr. **Bilirakis**. Where would that containment have taken place?

Admiral **Williams**. Right there in the containment building itself, which surrounds the reactor.

Mr. **Bilirakis**. It would have never reached the point where it might have hurt the public on the outside?

Admiral **Williams**. No, let's get into that for a second. Everybody tries to put the full burden of risk on the design of systems and components. You have three lines of defense in that plant in my mind.

You have the original design and component design, and the integrity of those systems. There are really four. Then, the maintenance of those, so that they perform as designed. You recognize that you are not going to be perfect in those areas, and there are going to be failures.

That is the reason that you go to such great lengths to train your operators to properly operate the systems, and particularly to recognize when equipment is not operating properly and take the emergency procedures that are taken.

That is the second line of defense. If all of that fails, you have what happened at Three Mile Island and you rely on the containment, which held. Davis-Besse, that second line of defense, which is insisted upon by the Nuclear Regulatory Commission and is knowledgeably put in place, because the first line of defense is not a perfect one, functioned extremely well.

As a matter of fact, it functioned so well that an initial operator error was quickly recognized by the guy that made it, by his boss, and they rectified it.

Those operators knew their system so well that even with the malfunctions that occurred, because after the initial operator error, they bailed the plant out, and so, if that had failed, then you potentially had a problem with release of radioactivity in the containment.

Does that answer your question, sir?

Mr. ECKART. The time of the gentleman has expired. If you want to follow it, go ahead.

Mr. BILIRAKIS. Well, there was a release of radioactivity. Where?

Admiral WILLIAMS. In the containment inside the building.

Mr. BILIRAKIS. There was no way it could have escaped that building?

Admiral WILLIAMS. No.

Mr. BILIRAKIS. It would not have harmed the public at large?

Admiral WILLIAMS. That is the way it is designed; yes, sir.

Mr. ECKART. Do things always work the way they are designed?

Admiral WILLIAMS. Not always, but that second line certainly did, Mr. Eckart.

Mr. BILIRAKIS. Thank you, Mr. Chairman.

Mr. ECKART. Admiral, a matter of concern to us is the detailed management program that you have now instituted since your arrival. May I add parenthetically, with this new affiliation or association between Toledo Edison and CEI, are your duties limited exclusively to the activities at the Toledo Edison part of this merger, association, affiliation, whatever it is?

Admiral WILLIAMS. Yes, sir. They are limited totally to the Davis-Besse. That other oversight is in my position description, but by agreement with John Williamson when I went there, I would spend no time on that until I felt comfortable with the Davis-Besse operation.

Mr. ECKART. Thank you.

You heard the earlier exchange I had with Mr. Denton concerning the financial limitations and to what extent those impinge or assist utilities. Let me ask you those questions directly.

Does Toledo Edison intend to ask the PFC of Ohio to pay for the cost of purchased power during the period of the shutdown?

Admiral WILLIAMS. Mr. Chairman, I don't know that. Let me tell you my role in this.

Mr. **Eckart**. Yes, sir.

Admiral **Williams**. I agreed to go to Davis-Besse under the conditions that I would be provided the resources with which to achieve the level of excellence that John Williamson told me that he wanted in that plant.

That was without regard to cash flow or to rates or anything else, and I will be the first one to admit, I don't understand the rate business, and they are not asking me about it.

All I am doing is telling them what I need to get Davis-Besse well and the whole nuclear mission well, and they are providing it without question.

Mr. **Eckart**. So you are not part of a discussion with Mr. Denton or others concerning financial constraints as to the potential restartup of Davis-Besse?

Admiral **Williams**. No, except to say that the sooner we got it back on the line, the better the economic conditions were going to be, and that I intended to go to parallel paths to get the plant well to do that, and I would need all of the support and assistance of the staff of the NRC that I could get to make that happen.

Mr. **Eckart**. When do we expect that startup time to be?

Admiral **Williams**. I don't know yet. I had hoped to start the startup process the first week in November, but there are some issues that are evolving in the development of testing of the 31 systems that are evolving slowly.

There are some questions about the environment qualifications of some of the instrumentation that I don't have the answers to and so as of this date, I can't tell you when I am going to start that plant up.

Mr. **Eckart**. Let me ask you directly about the question I asked the Commission concerning the calibration of the motor-operated valves.

What is your understanding of the situation at the time of the accident and of testing incidents and at the time after?

Admiral **Williams**. Those motor-operated valves are difficult valves to adjust. They have a torque and a limit switch on them. They weren't adjusted properly.

Mr. **Eckart**. How many of those are there?

Admiral **Williams**. There are 166 safety-related valves or 164 and 232 total that are nonsafety-related systems.

Mr. **Eckart**. How many of those were not calibrated or adjusted correctly?

Admiral **Williams**. How many have we done so far, John? 66? Mr. Wood will answer that question.

Mr. **Eckart**. Mr. Wood?

Mr. **Wood**. The findings there were in two parts. One, the maintenance was not done correctly on some of the valves and in at least one case, the [illegible] setting that was designed prior to 6/9 was not in place.

The second part was the settings on the valves did not provide the desired design margin to insure that the valves would function under the full range of requirements, thus, the valves would not necessarily have failed to perform when called upon, but in fact, on numerous occasions, they have actuated successfully.

But the margin available was less than desired.

Mr. **Eckart**. What does that mean? That sounds like margin available was less than desired? Sounds to me like revenue enhancements.

Admiral **Williams**. You like a little insurance on the engineering side of things. If I said to John Wood, "I want you to adjust those so that the torque switch does not become involved in the operation until the valve is 10 percent open," John would say to me, "That is not enough margin, Admiral."

I don't buy that, because I can't tell you what the dimensions of that valve are that surely—and he would say, "I want at least 20 percent," and that is what we are using, and as a matter of fact, that is essentially what he said to me at one point in time.

Mr. **Eckart**. Let me focus back on the management question. I understand that there have been some, for lack of a better word, Admiral, complaints from operators at Davis-Besse concerning the loss of personnel because of low salaries.

What efforts, if any, have you made to bring salary levels to normal at Davis-Besse for operators at the plant?

Admiral **Williams**. We have reorganized the entire operation, and we have set the salaries at what I consider to be competitive levels, and those salaries have been approved by Mr. Williamson.

Sixty percent of that increase for the people that are there now will occur on January 1, 1986. The remaining 40 percent will take place January 1, 1987. The people who I now must go hire to fill these vacancies that I have created by the reorganization will be paid whatever competitive price I have to pay to get them in there within the salary range that has been adjusted.

The adjustments of the people's salaries range from 10 percent to 25 percent. I have one case where it is even 30 percent, but that is an isolated case. But the reactor operators, I think, are going from about $33 to $40,000 a year.

When I established the maintenance group, you only do good maintenance with good people. We went out to get general foremen, and I am paying $50,000 a year to the general foreman, mechanical and electrical and control and instrumentation that I brought in, $60,000 to a material manager.

We have brought in superintendents above them which didn't exist before at higher costs than that, and I pay them for the talent and I am going out and getting it.

If they don't perform, I will remove them and put somebody else in there, but we are going to move this ahead. It is a considerable commitment by the company to do this.

Mr. **Eckart**. Thank you, Admiral.

Mr. Oxley.

Mr. **Oxley**. Thank you, Mr. Chairman.

Admiral Williams, did you go to Davis-Besse directly from the Navy?

Admiral **Williams**. No. I retired from the Navy in 1977 and was director of nuclear and waterfront operations and construction.

At General Dynamics I was in charge of submarine construction. Then I was with EB until 1981, and I formed my own consulting engineering firm. Went to Cincinnati Gas and Electric. Left that in 1983, 1984, left when they decided to convert to oil because I don't know anything about that, and resumed my consulting business until I talked to Mr. Williamson in April of this year.

Mr. **Oxley**. Your background did contain experience in the nuclear field?

Admiral **Williams**. Yes. I was in the nuclear Navy. I commanded two nuclear submarines. I was the commander of the submarine force in the Atlantic with some 350 ships including NATO submarines under me.

Yes, I have a good background in the nuclear field.

Mr. **Oxley**. Admiral Williams, you were here for my questions to the other panel about standardization and the comments I made as well as the panel members and other members of our committee.

What is your opinion on standardization in general, and indeed, are you familiar with legislation that is pending, including Mr. Moorhead's bill and the bill that was recommended by NRC, or at least some members of NRC, on the standardization issue?

Admiral **Williams**. I am not familiar with those two bills, but I am a proponent of standardization. It makes things less costly. It makes the inspection easier, makes the operating easier, makes the support easier. It is just the only way to go.

The discussions I heard here this morning, I would recommend that they look at the way the naval reactors branch has standardized their nuclear plants throughout the years. We settle on a design and we run it through a class of ships, sometimes through two or three classes of ships, not that we don't modify the propulsion plants for sound quieting and this kind of thing, but fundamentally that design remains as it is.

We handle the supplier problem to try for standardized design. In the 688 class, when it came to standardizing secondary plant machinery, what we call standardizing equipment, we had Newport News do the buying for all those. EB was constructing so we would have pumps made by the same people, of the same suppliers, same spare parts.

Standardizing training then becomes very easy and you ought to set up in this country a training center that trains the operators for all the utilities and where they go for refresher training and then you have a standardized level of training. That is really the only way to do this business, Mr. Oxley.

Mr. **Oxley**. Admiral, have you had experience with viewing or becoming aware of other countries that have nuclear facilities, and indeed, what effort they have made toward standardization?

Admiral **Williams**. Well, they haven't made much of it except we know that France is standardizing. I don't know anything about their industry. My experience has been totally limited to Spain, and the standardization there, of course, doesn't exist.

Mr. **Oxley**. I have a great deal of interest in Davis-Besse—I try to fish occasionally in the shadow of the cooling tower—and obviously I am interested because it affects my area of the State, even though I think most of my district doesn't necessarily draw power from Davis-Besse or Toledo Edison.

I would be interested, if and when you have the time, that you would take a look at the standardization legislation that has been proposed. Also, I am interested in what appears to be somewhat of a difference of opinion among some of the members of the former panel as to whether standardization is indeed effective for nothing but future construction or whether indeed we could apply some form of standardization to already existing facilities. What is your opinion on that?

Admiral Williams. On the latter part, I think applying it to existing facilities would be very difficult.

Mr. Oxley. So your support of standardization for the most part would be toward new facilities that would be constructed after the standardization procedure had been established by the Congress?

Admiral Williams. Yes, sir.

Mr. Oxley. Thank you.

Thank you, Mr. Chairman.

Mr. Eckart. Thank you.

Mr. Nielson from Utah.

Mr. Nielson. Thank you.

You mention there could have been a similar or much more serious accident but they fixed it quickly. What do you attribute that to? The Davis-Besse operators?

Admiral Williams. They have good training and understanding of the details of their systems and how they operate, also location of the equipment.

Those guys raise several decks very rapidly through doors to get to specific valves and they knew precisely where to go and what to do when they got there. Not in all instances did they know exactly what to do when they got there, but they handled it well enough.

Mr. Nielson. How can you assure us Davis-Besse will be safe to operate after you finish your operations?

Admiral Williams. We are going to do the corrective actions that are required for the equipments that failed and the testing will be designed to prove those systems.

More importantly, I think, are the 31 systems that we are reviewing to determine whether or not—what level of confidence we have in their operability. They are undergoing a very, very thorough review.

I have highly technically qualified people that are overseeing that and we will take whatever corrective action we find to be necessary in those systems and we will also design the tests that give us the confidence that the systems will operate properly.

Mr. Nielson. You want to make Davis-Besse the best plant in the country. How long do you think it will take to do that?

Admiral Williams. Two years.

Mr. Nielson. Very good.

NRC suggests you have a third auxiliary feedwater pump. Would that have made any difference in this particular instance? If that had been there, would that have affected the accident one way or the other?

Admiral Williams. No, not really. It was a valve failure that did the damage.

Mr. Nielson. Why are they recommending that third pump?

Admiral Williams. You do need it. First thing I did when I got there was to take a look at their plans to put that in next spring. I said, "Pull it back and let's put it in now."

I like to skate on thicker ice. I like a lot of margin. I came from a community of fast, deep-diving submarines, with nuclear plants, and you just like to build the ice as thick as you can. They needed it thicker and that pump provided it.

Mr. NIELSON. What general recommendation would you make to the NRC on the basis of what your experience has been with Davis-Besse?

Admiral WILLIAMS. General recommendations?

Mr. NIELSON. Yes. What recommendation would you make to the NRC?

Admiral WILLIAMS. Keep doing what they are doing and keep improving the quality of their staffs, because I have seen since Three Mile Island a definite improvement in the quality of their people and the understanding of their people as to what really constitutes a safe, reliable operation of plants.

After Three Mile Island, they were a very small organization, and all of a sudden money was thrown at them and positions were thrown at them, and they were told to go out and build this comprehensive pricing group and they went out into a market for talent that really wasn't there, and they brought in a lot of people, and they quickly wrote a lot of regulations.

It is a painful thing to go back and purify all of that and to get rid of the people that were no good and get people that are good. And that organization, my experience with it has been that it is professional and getting more professional every day.

The greatest single thing you could do with it is make a one-man commission out of it and that would help.

Mr. NIELSON. May I depart a little bit from this one to previous hearings where Mr. Eckart and Mr. Sikorski are concerned about some of the rulemaking that was made not through the open meetings in Louisiana and so on.

Did you concur with the restarting of Three Mile Island? Did you concur with that decision, and do you concur with the way that decision was arrived at?

Would you rather not get into that?

Admiral WILLIAMS. Well, I will say if the NRC recommended Three Mile Island be restarted, I am confident to say we can restart Three Mile Island. I don't know anything about TMI.

Mr. NIELSON. It doesn't disturb you there was no public comment on that, it was done privately rather than a public meeting?

Admiral WILLIAMS. I don't know how private it was. If those people say the plant is ready to start up, Mr. Nielson, I think it is ready to start up. I would start it up.

Mr. NIELSON. The only thing that disturbs me about your testimony, in connection with the chairman, Mr. Eckart asked you about whether retro backfit could be done in these old plants, and you said they couldn't.

Admiral WILLIAMS. I didn't say the retrofits could be done; I said standardization was a problem.

Mr. NIELSON. I misunderstood then.

Admiral WILLIAMS. Standardization, those plants out there have a plethora of equipment that is manufactured by diverse manufacturers.

Mr. NIELSON. They could be brought up to current standards, though?

Admiral WILLIAMS. No question about that.

Mr. Nielson. Even though they wouldn't be standardized, they would be brought up to standard.

Admiral Williams. I think you have to weigh the backfit to see what the value of it is. If it is a marginal benefit, then don't do it, and now we get into the discussion of what is marginal and what is trivial and I don't know and that is a judgment issue.

But not everybody's private acts ought to be ground in that arena.

Mr. Nielson. One last question. You mentioned the one thing that most disturbed you was the fact the equipment was not in very good shape.

What are you doing on the maintenance side? You mentioned that is one thing you are doing.

Could you be more specific as to what you are doing to bring this equipment up to par and improve the maintenance of it and the checking on it?

Admiral Williams. It is no secret what you do is to get good mechanics there and supervisors, ones that can read these days and understand the vendor manuals. That is crucial, and you pay the price to get them. And you put the supervisor, the foreman ratio at something he can manage, and we have reduced it to about 1 to 6 to 1 to 10 instead of 1 to 20 to 1 to 23.

We have hired some very good people. And you make sure the vendor manuals and the drawings they have are accurate, and you say to them, "Go fix this."

Now, that is a simplistic approach, but you also design for the long haul; you make sure your preventive maintenance program is a valid one.

Mr. Nielson. The purpose of this question was simply, are you satisfied that you were able to correct the things that most disturb you when you went there?

Admiral Williams. Absolutely.

Mr. Nielson. Thank you, Mr. Chairman.

Mr. Eckart. Admiral, how many additional people are you hiring as a result of your new management program?

Admiral Williams. We are going from 690 in the management area to 930.

Now, that is not the tradesmen. The tradesmen I think go up to whatever I need to do with the jobs at hand.

Mr. Eckart. That is an additional 240 new people in management.

Admiral Williams. That is right.

Mr. Eckart. That is a phenomenal improvement.

Admiral Williams. Yes, sir.

Mr. Eckart. Does that suggest the sorry state of affairs before you arrived?

Admiral Williams. Well, it suggests that the people—this is true throughout industry—those types of people were being employed somewhere, Mr. Chairman. They were in Bechtel or B&W or Signa or somebody out there.

The problem is that you paid double for that kind of help and then they are not accountable.

So what you want to do is get them in your house so they are working for you and you look at them in the eyeball every day and he doesn't run home to Maryland on the weekends, back to Gaithersburg or wherever they disappear to.

Mr. ECKART. There are a lot of people who like Gaithersburg.

Admiral WILLIAMS. If I were in Gaithersburg, I would say they disappear to Toledo.

But you bring that effort in house and you will find in the long run it is cheaper. You are going to pay a Delta the first couple of years until you can fill all those vacant chairs, because the vacant chairs, particularly in engineering, I have to fill. I am going to have to go to the Bechtels and Stone and Websters and select older engineers and put them in as permanent employees until I can handle the employees.

If you have never seen a job fair, come out on the 17th of October. I will show you a job fair and the way we go about hiring people.

It is going to take us time to get there. I don't want to make light of it, sir, but that is a tremendous commitment on the part of the company. I think it shows a measure of where Mr. Williamson intends to go.

Mr. ECKART. Admiral, your commitment to this Nation is well known and the demonstration of that renewed commitment to our constituents in Ohio is very much appreciated.

If there are no additional questions, I thank the panel and, Admiral, we thank you for your attendance.

The hearing stands adjourned subject to the call of the Chair.

[The following material was inserted for inclusion in the printed record:]

NINETY-NINTH CONGRESS

EDWARD J. MARKEY, MASSACHUSETTS, CHAIRMAN

AL SWIFT, WASHINGTON
JOHN BRYANT, TEXAS
MICKEY LELAND, TEXAS
RICHARD C. SHELBY, ALABAMA
RON WYDEN, OREGON
RALPH M. HALL, TEXAS
DENNIS E. ECKART, OHIO
GERRY SIKORSKI, MINNESOTA
JOHN D. DINGELL, MICHIGAN
(EX OFFICIO)

CARLOS J. MOORHEAD, CALIFORNIA
MICHAEL G. OXLEY, OHIO
HOWARD C. NIELSON, UTAH
MICHAEL BILIRAKIS, FLORIDA
FRED J. ECKERT, NEW YORK
JAMES T. BROYHILL, NORTH CAROLINA
(EX OFFICIO)

LAWRENCE R. SIDMAN
CHIEF COUNSEL AND STAFF DIRECTOR

[illegible]
HOUSE OFFICE BUILDING ANNEX NO. 2
PHONE (202) 226-2424

U.S. HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON ENERGY CONSERVATION
AND POWER
OF THE
COMMITTEE ON ENERGY AND COMMERCE
WASHINGTON, DC 20515

June 17, 1985

The Honorable Nunzio J. Palladino
Chairman
Nuclear Regulatory Commission
1717 H Street, NW
Washington, D. C. 20555

Dear Mr. Chairman:

The June 9, 1985 incident at the Davis-Besse reactor near Toledo, Ohio is one of the most serious since the 1979 accident at Three Mile Island.

The large number of failures and the similarity to the accident at Three Mile Island raise significant concerns. I am particularly troubled by the fact that NRC had previously recommended improvements to the auxiliary feedwater system and had previously identified serious management deficiencies at Davis-Besse. Hence, it appears that there may have been opportunities to prevent such a close call.

The Commission must devote the same degree of scrutiny to itself as it does to the licensee. It is important to determine the extent to which NRC is responsible for allowing Davis-Besse to suffer a major degradation of essential safety related equipment.

I would like to request that the Subcommittee be briefed on the Davis-Besse incident and other related matters on Friday, June 21, 1985 at 9:30 a.m. by the NRC Staff. In addition to a representative of the Task Force investigating the incident, I would also request that William Dircks, Harold Denton and James Keppler be in attendence to brief Members of the Subcommittee. As the briefing will be open to the public, the Commission is certainly welcome to attend, although this is not required.

The Honorable Nunzio J. Palladino
June 17, 1985
Page 2

Additionally, I request your response to the attached questions within ten working days. Some of these questions may arise at the briefing on Friday. While I understand that your analysis of the incident is continuing, and that some of your answers may necessarily be subject to change, your preliminary response should be provided by June 28, 1985 at the latest. A complete response should be provided to the Subcommittee prior to any restart of Davis-Besse.

Thank you for your attention to this important matter.

Sincerely,

Ed Markey

Edward J. Markey
Chairman

EJM:mw

Attachment

Questions for the Nuclear Regulatory Commission

1. List each failure that occurred during the Davis-Besse incident including: (a) the cause(s) of each failure; and (b) the intended function of the system or component that failed.

2. Based on probabalistic risk analyses and precursor data prior to the Davis-Besse incident what was the estimated probability of the following:

   a. loss of main feedwater;

   b. loss of main feedwater and loss of auxiliary feedwater;

   c. failure of PORV to close;

   d. each other failure that occurred during the incident;

   e. the combination of all the failures that occurred during the incident.

3. Had the electric driven startup pump not manually started during the Davis-Besse incident, and had the auxiliary feedwater system not been restored, would there have been a severe core damage accident? If yes, how long would it have taken before fuel damage occurred?

4. According to preliminary information provided by the NRC Staff, the Emergency Core Cooling System (ECCS) at Davis-Besse is unable to function properly when the primary cooling system is pressurized in excess of 1,600 pounds per square inch. If this is true, why did the operators initiate the ECCS during the Davis-Besse incident and why did they terminate ECCS? What other pressurized Water Reactors (PWR) have High Pressure Injection pumps whose shutoff head is below the set point of the code safety valves?

5. According to preliminary information provided by the NRC staff, Davis-Besse is not capable of cooling the reactor using the "feed and bleed" process. What is the technical basis for not requiring Davis-Besse to be capable of cooling the reactor using this process? Identify all PWR's for which feed and bleed has been demonstrated -- using safety evaluations performed in accordance with establish NRC requirements -- to be an adequate method of core cooling.

6. Does the failure of the PORV during the Davis-Besse incident raise questions about the adequacy of testing done in accordance with the TMI Action Plan? Additionally, please provide the following information: (a) was the specific PORV model used at Davis-Besse tested as part of the TMI Action Plan; (b) how many other plants have the same model PORV; and

(c) how many PORV failures have occurred during operation or testing since the accident at Three Mile Island?

7. Does the auxiliary feedwater system at Davis-Besse provide greater, equal or smaller margin of safety than the auxiliary feedwater system at other pressurized water reactors?

8. Provide a history of any previously noted difficulties observed with the main or auxiliary feedwater systems at Davis-Besse since 1979 and any actions taken in response.

9. What are the generic implications and lessons learned from the Davis-Besse incident?

10. In light of the Davis-Besse incident, is there any information of which the Commission is aware that would lead it to reconsider any of the positions taken by the NRC Staff, or in any of its own decisions, in the TMI restart proceeding? For example, in the TMI restart proceeding, the NRC Staff contended that a total loss of feedwater was beyond the design basis and therefore, capability to accomplish feed and bleed was not required.

11. List those TMI Action Plan items directly relevant to the Davis-Besse incident and provide the current status of compliance. Specifically included in your response should be a detailed explanation of what actions were taken and when in response to those TMI Action Plan items concerning the auxiliary feedwater system and pilot operated relief valve. Your response should clearly identify those relevant Action Plan items that have not been fully implemented and explain when each item was originally scheduled to have been completed and the reason it remains outstanding.

12. In NUREG-0667, Transient Response of Babcock & Wilcox-Designed Reactors (May 1980), the NRC specifically recommended that Davis-Besse improve safety by installing a diverse drive auxiliary feedwater pump. Acccording to preliminary information provided by the NRC Staff, this recommendation was suspended and is now pending for the next refueling outage in 1986. Please provide a detailed history of all actions taken in response to this recommendation and all actions since 1979 taken concerning the auxiliary feedwater system at Davis-Besse. Your response should include a listing of all meetings, copies of all correspondence between NRC and the licensee and all documents concerning the auxiliary feedwater system since 1979.

13. In terms of configuration, reliability, diversity and capacity how, if at all, does the auxiliary feed water system at Davis-Besse differ from the system in place on March 28, 1979?

14. According to preliminary information provided by the NRC

Staff, the licensee has resisted NRC recommendations to improve the reliability and capacity of the auxiliary feedwater system at Davis-Besse. Is this true and if so, why did NRC not require that improvements be made?

15. The Commission was provided with a preliminary sequence of events which occured at Davis-Besse in a June 12, 1985 memorandum from William J. Dircks, Executive Director for Operations that appears not to include several important details of the incident. For example, the preliminary chronology fails to note that the PORV stuck open, that ECCS was initiated and turned off, and that one of the auxilary feedwater pumps could not be returned to operation from the control room. When did the Commission first become aware of this information and why was it not transmitted to the Commission in the June 12, 1985 memorandum?

16. According to a June 13, 1985 memorandum from William J. Dircks, Executive Director for Operations, to the Commission the licensee failed to provide accurate information to the NRC about the Davis-Besse incident. The memorandum states: "It became clear the the initial written description of the event was incomplete and that a number of potentially important details were not included." What information was incomplete and what details were not included in the licensee's initial report to NRC? What is the reason for this failure and what, if any, reporting requirements were violated?

17. What actions will NRC require prior to restart of Davis-Besse. Specifically, will NRC require that the January 1985 license condition committing to an additional auxiliary feedwater pump be fulfilled prior to restart. In not, please explain why.

18. List all pending requirements and licensing actions relating to systems and components involved in the Davis-Besse incident.

19. According to a June 13, 1985 memorandum from William J. Dircks, Executive Director for Operations, to the Commission, the NRC Task Force investigating the incident has allowed a lawyer representing the licensee to be present during interviews with workers at the plant. This practice was used during the investigation of the accident at Three Mile Island where some believe it resulted in less than candid testimony from workers and enabled the company to coordinate testimony. Practices such as this were also harshly criticized by the Department of Justice in a March 25, 1983 letter. Why is this practice being allowed at Davis-Besse when the NRC has already noted that information originally provided was less than complete? What, if any, policy does NRC have on third party attendence during investigations?

20. Please provide the following information for each year since 1980:

    a. the number 10 CFR 50.72 reports;

    b. the total number of Licensee Event Reports, specifying the number attributable to personnel error, equipment failures, and design or fabrication errors;

    c. the number of unusual events, alerts and abnormal occurrences;

    d. the number and cause of reactor trips; and

    e. the number of all enforcement actions including a brief description of the issue, the severity classification and any fine levied.

21. NRC's most recent Systematic Assessment of Licensee Performance report on Davis-Besse noted that improvment was needed in 5 of 11 areas. The report concluded that "strong steps are needed to raise the performance level at the Davis-Besse facility." Specifically what actions has NRC taken?

22. What are the root causes of management problems noted by NRC at Davis-Besse? What steps should be taken to correct these problems? Provide any documents including internal memoranda that relate to NRC concerns about Davis-Besse's regulatory performance.

23. Please provide all documents including internal NRC staff memoranda which relate to the Davis-Besse incident. Your response should provide all documents generated by the NRC Task Force investigating this matter including transcripts of interviews with employees of Toledo Edison.

24. At the Subcommittee's April 17, 1985 budget authorization hearing, the Commission testified that some plants dominate the probability of a severe accident as reported in the Commission's 45 percent estimate of a core meltdown at a U.S. reactor in the next 20 years. Is Davis-Besse one of those plants? What factors are important in identifying those plants most likely to have a severe accident? What facilities has the Commission identified as most likely to have a severe accident and what actions has the Commission taken at each?

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

CHAIRMAN

July 17, 1985

RECEIVED
JUL 18 1985
Energy Conservation and Power

The Honorable Edward J. Markey, Chairman
Subcommittee on Energy Conservation and Power
Committee on Energy and Commerce
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

In response to your letter of June 17, 1985, we are forwarding the preliminary responses of our Executive Director for Operations (EDO) to the questions that you raised concerning the June 9, 1985 incident at the Davis-Besse reactor. Please note the caveats in the cover memorandum from the EDO. The Commission maintains an active interest in this matter and we plan to have a full staff briefing as soon as the report of the task force is available.

Sincerely,

Thomas M. Roberts
Acting Chairman

Enclosure:
As States

cc: Rep. Carlos Moorhead

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

July 5, 1985

MEMORANDUM FOR: Chairman Palladino

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: RESPONSE TO CONGRESSMAN MARKEY'S LETTER OF JUNE 17 CONCERNING DAVIS-BESSE

I am forwarding revised responses to several of the questions that Congressman Markey raised in his letter of June 17, 1985 concerning the June 9, 1985 incident at the Davis-Besse reactor. These changes reflect a further staff review of the question package provided to you on June 28. It is necessary to point out to you that these responses do not factor in the facts as will finally be determined by the Task Force. I anticipate that the report of the task force investigating the incident will be completed and made available to the Commission by July 24.

We caution use or dissemination of this information until a more measured review of these questions can be accomplished. I also bring to your attention that several of the documents provided in support of the attached response are marked proprietary and should not be released outside of the Subcommittee.

William J. Dircks
Executive Director
for Operations

Attachment:
As stated

cc: Commissioner Asselstine
Commissioner Bernthal
Commissioner Zech
James Cutchin, OCM
SECY
OGC
OPE

QUESTION 1. LIST EACH FAILURE THAT OCCURRED DURING THE DAVIS-BESSE INCIDENT INCLUDING:

(A) THE CAUSE(S) OF EACH FAILURE.

(B) THE INTENDED FUNCTION OF THE SYSTEM OR COMPONENT THAT FAILED.

ANSWER.

THE EQUIPMENT AND SYSTEMS LISTED BELOW ARE THOSE IDENTIFIED BY THE DAVIS-BESSE NRC FACT-FINDING TEAM AS INVOLVING A FAILURE, UNEXPECTED PERFORMANCE, OR QUESTIONS ABOUT ADEQUACY OF PERFORMANCE. AS A RESULT, THESE ITEMS HAVE BEEN PLACED IN QUARANTINE AND WILL BE THOROUGHLY EXAMINED AND TESTED TO DETERMINE CAUSE OF FAILURE OR UNEXPECTED PERFORMANCE AND THE CONTRIBUTION, IF ANY, TO THE CONSEQUENCES OF THE INCIDENT. THE TEAM REPORT WILL ADDRESS THE RESULTS OF THIS EFFORT.

1. MAIN FEEDWATER PUMP TURBINE AND CONTROLS
   (SUPPLIES FEEDWATER TO THE STEAM GENERATORS WHERE IT IS CONVERTED TO STEAM)

2. STEAM AND FEED WATER RUPTURE CONTROL SYSTEM AND ASSOCIATED INSTRUMENTATION CHANNELS
   (SYSTEM IS TO DETECT POSSIBLE RUPTURES OF STEAM LINES RESULTING IN LOW STEAM GENERATOR PRESSURE OR FEEDWATER LINES RESULTING IN LOW STEAM GENERATOR LEVEL AND INITIATE APPROPRIATE CORRECTIVE ACTION)
3. AUXILIARY FEED PUMP TURBINES AND CONTROLS
   (PROVIDES FEEDWATER TO STEAM GENERATORS UNDER EMERGENCY CONDITIONS)
4. MAIN STEAMLINE ISOLATION VALVES INCLUDING CONTROLS, ACTUATING CIRCUITS, PNEUMATIC SUPPLIES
   (THESE VALVES ISOLATE THE STEAM GENERATORS IN CASE OF A STEAMLINE RUPTURE TO PREVENT OVERCOOLING OF THE REACTOR)
5. STARTUP FEED VALVE SP-7A AND CONTROLS
   (THIS VALVE CONTROLS FLOW FROM THE STARTUP FEEDWATER PUMP TO STEAM GENERATOR NO. 2)
6. SOURCE RANGE INSTRUMENT CHANNELS
   (THIS INSTRUMENTATION MONITORS NEUTRONIC CONDITIONS OF THE CORE UNDER STARTUP OR SHUTDOWN CONDITIONS)

7. TURBINE BYPASS VALVE SP-13A2
(THIS VALVE ALLOWS STEAM TO BYPASS OR DIVERT AROUND THE MAIN TURBINE TO THE CONDENSER. IT IS USED DURING STARTUP OR UNDER CONDITIONS WHERE THERE IS A MISMATCH BETWEEN TURBINE LOAD AND REACTOR POWER)

8. STEAM TRAPS AND DRAIN VALVES
(THESE COMPONENTS PERMIT CONDENSATE TO BE ELIMINATED FROM THE MAIN STEAMLINES)

9. POWER OPERATED RELIEF VALVE, CONTROLS AND ACTUATION SYSTEM
(THIS VALVE ALLOWS REACTOR PRESSURE TO BE DECREASED BY VENTING OF THE VAPOR IN THE PRESSURIZER)

10. MAIN STEAM SAFETY VALVES AND ATMOSPHERIC VENT VALVES
(THESE VALVES PROVIDE OVERPRESSURE PROTECTION TO THE MAIN STEAMLINES)

11. AF 599 AND AF 608 VALVES, ACTUATORS AND CONTROLS
(THESE VALVES SERVE AS THE CONTAINMENT ISOLATION VALVES FOR THE TWO TRAINS OF THE AUXILIARY FEEDWATER SYSTEM)

12. VALVE MS 106 AND CONTROLS
(THIS VALVE CONTROLS STEAM FLOW TO THE AUXILIARY FEEDWATER PUMP TURBINE NO. 1)

13. SERVICE WATER VALVE AND CONTROLS ON AFW ALTERNATE SUPPLY (THIS VALVE ALLOWS THE AFW PUMP TO DRAW WATER FROM AN ALTERATE SUPPLY SOURCE, I.E., THE SERVICE WATER SYSTEM RATHER THAN THE CONDENSATE STORAGE TANK)

IN ADDITION TO THE ABOVE EQUIPMENT UNCERTAINTIES, AN OPERATOR ERROR HAS ALSO BEEN IDENTIFIED. WHEN THE CONTROL ROOM OPERATOR ATTEMPTED TO MANUALLY INITIATE THE STEAM FEED-WATER RUPTURE CONTROL SYSTEM, (SFRCS), HE INCORRECTLY ACTUATED THE SFRCS ON LOW STEAM PRESSURE INSTEAD OF THE DESIRED LOW STEAM GENERATOR LEVEL. THIS ERROR WAS PROMPTLY DETECTED AND RECOVERY ACTION WAS INITIATED.

QUESTION 2. BASED ON PROBABILISTIC RISK ANALYSES AND PRECURSOR DATA PRIOR TO THE DAVIS-BESSE INCIDENT, WHAT WAS THE ESTIMATED PROBABILITY OF THE FOLLOWING:

A. LOSS OF MAIN FEEDWATER;

B. LOSS OF MAIN FEEDWATER AND LOSS OF AUXILIARY FEEDWATER;

C. FAILURE OF PORV TO CLOSE;

D. EACH OTHER FAILURE THAT OCCURRED DURING THE INCIDENT;

E. THE COMBINATION OF ALL THE FAILURES THAT OCCURRED DURING THE INCIDENT.

ANSWER.

NO OVERALL PROBABILISTIC RISK ASSESSMENT OF DAVIS-BESSE HAS BEEN DONE BY, OR SUBMITTED TO, THE NRC STAFF. THE NRC HAS RECEIVED TWO PLANT-SPECIFIC RELIABILITY ANALYSES OF THE DAVIS-BESSE AUXILIARY FEEDWATER SYSTEM, THE MOST RECENT DONE BY EDS FOR TOLEDO EDISON AND SUBMITTED TO THE NRC IN DECEMBER 1981. AN INDEPENDENT ESTIMATE OF THE FAILURE PROBABILITY OF THE

DAVIS-BESSE AFW SYSTEM HAS BEEN MADE FOR THE NRC BY BROOKHAVEN NATIONAL LABORATORY. NONE OF THESE ANALYSES COVER MANY OF THE OTHER SYSTEMS OR COMPONENTS INVOLVED IN THE INCIDENT OF JUNE 9. NONE OF THE STUDIES REFLECT PRECURSOR PLANT SPECIFIC FAILURES EXPERIENCE RELATED TO THE JUNE 9 EVENT.

BECAUSE OF THESE LIMITATIONS, THE ESTIMATES PROVIDED BELOW SHOULD BE REGARDED AS VERY ROUGH, PRELIMINARY ESTIMATES THAT MAY NOT REFLECT THE PARTICULARS OF THE DAVIS-BESSE DESIGN OR OPERATING EXPERIENCE.

A. LOSS OF MAIN FEEDWATER:

COMPLETE INTERRUPTIONS OF MAIN FEEDWATER OCCUR ROUGHLY ONCE PER REACTOR YEAR OR LESS.* IN MOST PLANTS, A SUBSTANTIAL FRACTION OF THESE ARE RESTORABLE IN TIME TO AVERT A CRITICAL DEMAND FOR ALTERNATIVE COOLING.

---

*"AUXILIARY FEEDWATER RELIABILITY ANALYSIS - FINAL REPORT," SUBMITTED WITH TOLEDO EDISON CO. LETTER, DECEMBER 31, 1981; AND INTERNAL STAFF MEMORANDUM, A. THADANI TO O. PARR, "AUXILIARY FEEDWATER SYSTEMS - CRGR PACKAGE," NOVEMBER 9, 1984.

B. LOSS OF MAIN AND AUXILIARY FEEDWATER:

SUSTAINED (CRITICAL) FAILURES OF MAIN AND AUXILIARY FEEDWATER ARE ESTIMATED TO HAVE A FREQUENCY IN THE RANGE OF TWO-IN A THOUSAND TO ONE-IN-TEN-THOUSAND PER YEAR.* BRIEF FAILURES OF THE KIND THAT OCCURRED ARE KNOWN TO BE MORE FREQUENT THAN SUSTAINED FAILURES, BUT NO ESTIMATE HAS BEEN MADE OF THE FREQUENCY OF BRIEF FAILURES.

C. FAILURE OF PORV TO CLOSE:

THE INDUSTRY AVERAGE PROBABILITY OF A PORV TO STICK OPEN IS ROUGHLY 0.02 PER CHALLENGE.** FOR A SEQUENCE OF EVENTS IN WHICH THE PORV LIFTS THREE TIMES, WE WOULD THUS EXPECT A SIX-PERCENT CHANCE THAT IT WOULD STICK OPEN.

D. EACH OTHER FAILURE THAT OCCURRED DURING THE INCIDENT:

ONE CHANNEL OF THE SOURCE RANGE NUCLEAR INSTRUMENTATION AND THE SAFETY PARAMETER DISPLAY SYSTEM ARE THOUGHT TO

---

*MEMORANDUM A. THADANI TO O. PARR, "ADDITIONAL INFORAMTION FOR THE AUXILLIARY FEEDWATER SYSTEM CRGR PACKAGE," JANUARY 16, 1984.

**NUREG-0560, P. 3-14.

HAVE BEEN INOPERABLE AT THE TIME. THE OTHER SOURCE RANGE CHANNEL IS THOUGHT TO HAVE FAILED ON DEMAND. PROBABILITY ESTIMATES ARE UNAVAILABLE FOR SUCH EVENTS. IT IS NOT UNUSUAL OR UNEXPECTED THAT SOME SAFETY-RELATED COMPONENTS BE OUT OF SERVICE FOR TEST AND MAINTENANCE, SO PERIPHERAL FAULTS OF THIS KIND ARE NOT UNLIKELY.

E. PROBABILITY OF THE COMBINATION OF ALL THE FAILURES THAT OCCURRED DURING THE INCIDENT:

NO ESTIMATE THAT CAPTURES THE PARTICULARS OF THE INCIDENT IS AVAILABLE.

COMMISSIONER ASSELSTINE ADDS THE FOLLOWING:

THE QUESTION IS STRAIGHTFORWARD BUT THE COMMISSION, WHICH GIVES SUBSTANTIAL SIGNIFICANCE TO PROBABILISTIC RISK ASSESSMENTS, QUANTITATIVE COST-BENEFIT ANALYSES AND QUANTITATIVE SAFETY GOALS CAN NOT COME UP WITH SIMPLE FAILURE PROBABILITIES ON A FEW COMPONENTS. FURTHER, THE COMMISSION CLAIMS TO BE ABLE TO QUANTIFY THE PROBABILITY OF A GIVEN SIZE EARTHQUAKE OCCURRING AT A GIVEN LOCATION, BUT CAN ONLY GIVE, AFTER SIX YEARS OF STUDIES OF THE DAVIS BESSE AFW SYSTEM, "VERY ROUGH, PRELIMINARY ESTIMATES" OF THE RELIABILITY OF ONE SYSTEM IN A PLANT. I BELIEVE A FORTHRIGHT RESPONSE TO THE QUESTION WOULD REVEAL SOME OF THE WEAKNESSES OF POLICIES AND PRACTICES THAT PLACE EMPHASIS ON QUANTIFYING THE

RELIABILITY AND RISKS OF COMPLEX PLANTS. I WOULD ALSO POINT OUT THAT THE COMMISSION HAS MORE CAVEATS ON THE RESPONSE TO THIS STRAIGHTFORWARD QUESTION THAN IT PLACES ON THE RESPONSES TO EXTREMELY COMPLEX ISSUES INVOLVING GREAT UNCERTAINTIES.

QUESTION 3. HAD THE ELECTRIC DRIVEN PUMP NOT MANUALLY STARTED DURING THE DAVIS-BESSE INCIDENT, AND HAD THE AUXILIARY FEEDWATER SYSTEM NOT BEEN RESTORED, WOULD THERE HAVE BEEN A SEVERE CORE DAMAGE ACCIDENT. IF YES, HOW LONG WOULD IT HAVE TAKEN BEFORE FUEL DAMAGE OCCURRED?

ANSWER.

IF NO FEEDWATER WERE RESTORED TO THE STEAM GENERATORS DURING THE DAVIS-BESSE EVENT, AND IF THE OPERATOR DID NOT TAKE ANY MITIGATIVE ACTION, SUCH AS INITIATING FULL MAKEUP FLOW AS REQUIRED BY THE EMERGENCY PROCEDURES, FUEL DAMAGE WOULD BE EXPECTED TO OCCUR AT APPROXIMATELY ONE AND ONE-HALF (1½) TO TWO (2) HOURS. HOWEVER, IF THE OPERATOR INITIATES FULL MAKEUP FLOW, AS REQUIRED BY PROCEDURES, APPROXIMATELY 160 GPM WOULD BE PROVIDED TO THE REACTOR COOLANT SYSTEM AT THE PRESSURIZER CODE SAFETY VALVE ACTUATION SETPOINT. FOR THIS CASE, THE CORE WOULD PROBABLY NOT HAVE EXPERIENCED FUEL DAMAGE AT DAVIS-BESSE. THE ABOVE ESTIMATES WERE DERIVED FROM SIMPLIFIED MASS AND ENERGY BALANCE CALCULATIONS OF THE DAVIS-BESSE PLANT. THE STAFF IS CURRENTLY PERFORMING MORE DETAILED ANALYSES USING ADVANCED COMPUTER CODES DEVELOPED IN NRC'S OFFICE OF NUCLEAR REGULATORY RESEARCH TO CONFIRM AND REFINE THESE ESTIMATES, AS WELL AS EXAMINE THE EFFICACY OF VARIOUS COMBINATIONS OF AVAILABLE SYSTEMS TO COOL THE CORE IN THE EVENT FEEDWATER WASN'T RESTORED IN A TIMELY MANNER.

QUESTION 4. ACCORDING TO PRELIMINARY INFORMATION PROVIDED BY THE NRC STAFF, THE EMERGENCY CORE COOLING SYSTEM (ECCS) AT DAVIS-BESSE IS UNABLE TO FUNCTION PROPERLY WHEN THE PRIMARY COOLING SYSTEM IS PRESSURIZED IN EXCESS OF 1,600 POUNDS PER SQUARE INCH. (IF THIS IS TRUE, WHY DID THE OPERATORS INITIATE THE ECCS DURING THE DAVIS-BESSE INCIDENT AND WHY DID THEY TERMINATE ECCS?) WHAT OTHER PRESSURIZED WATER REACTORS (PWR) HAVE HIGH PRESSURE INJECTION PUMPS WHOSE SHUTOFF HEAD IS BELOW THE SET POINT OF THE CODE SAFETY VALVES?

ANSWER.

THE PRELIMINARY SEQUENCE OF EVENTS OF THE DAVIS-BESSE INCIDENT CONTAINED IN THE JUNE 19, 1985 MEMORANDUM FROM WILLIAM J. DIRCKS, EXECUTIVE DIRECTOR FOR OPERATIONS, TO THE COMMISSION NOTES THE FOLLOWING ITEM:

JUNE 9, 1985, 01:58: TAVE RESTORED TO NORMAL POST-TRIP TEMPERATURE. THE COOLDOWN HAD LOWERED RCS PRESSURE TO ABOUT 1720 PSIG. OPERATORS MANUALLY STARTED THE HPI PUMP #1 IN THE PIGGY-BACK MODE (LPI PUMP 1 SUPPLYING THE SUCTION TO THE HPI PUMP 1). A SLIGHT AMOUNT OF WATER (ABOUT 50 GALLONS) WAS INJECTED.

THE "PIGGY-BACK MODE" REFERRED TO IN THIS EVENT MEANS ALIGNING THE LOW PRESSURE INJECTION (LPI) PUMP TO THE SUCTION OF THE HIGH PRESSURE INJECTION PUMPS. THIS HAS THE EFFECT OF PROVIDING THE HIGH PRESSURE PUMPS WITH THE CAPABILITY TO DEVELOP A PRESSURE OF GREATER THAN 1600 POUNDS PER SQUARE INCH (PSI). AS A CONSEQUENCE, THE ECCS IS CAPABLE OF INJECTING WATER INTO THE RCS AT PRESSURES ABOVE 1600 PSI; HOWEVER, THE TEAM IS INVESTIGATING WHY THE OPERATORS INITIATED AND THEN TERMINATED ECCS FLOW. THE TEAM WILL ADDRESS THE RESULTS OF THEIR REVIEW AND EVALUATION OF THIS ISSUE IN THEIR REPORT OF THE INCIDENT.

Other PWRs with ECCS pumps not capable of injecting against the pressurizer code safety valve set pressure are listed below. However, these plants, like Davis-Besse 1, generally also have additional injection pumps, which have lower capacity, are non-safety grade, and have shutoff heads in excess of the safety valve pressure. As a result, some capability generally exists at the following plants to: perform a feed and bleed mode of cooling.

Ginna
Indian Point 2 & 3
Kewaunee
H. B. Robinson
ANO-2
Point Beach 1 & 2
Prairie Island 1 & 2
Turkey Point 1 & 2
Ft. Calhoun
Calvert Cliffs 1 & 2
Millstone 2
Palisades
St. Lucie 1 & 2
Yankee Rowe

QUESTION 4. (CONTINUED) -4-

THE PLANTS LISTED BELOW CANNOT PERFORM FEED AND BLEED COOLING AS NO PORVS ARE AVAILABLE:

PALO VERDE
SAN ONOFRE 2 & 3
WATERFORD 3

QUESTION 5. According to preliminary information provided by the NRC staff, Davis-Besse is not capable of cooling the reactor using the "feed and bleed" process. What is the technical basis for not requiring Davis-Besse to be capable of cooling the reactor using this process? Identify all PWR's for which feed and bleed has been demonstrated -- using safety evaluations performed in accordance with establish NRC requirements -- to be an adequate method of core cooling.

ANSWER.

The NRC does not require any PWR to have a feed and bleed capability. Rather, the staff requires that all PWRs, including Davis-Besse, provide an auxiliary feedwater system to provide residual heat removal. The auxiliary feedwater system at Davis-Besse 1 is designed to safety related requirements and was considered to be sufficiently reliable by the staff at the time of its review. Although a combination of malfunctions resulted in a loss of all feedwater for approximately 12 minutes at Davis-Besse, the auxiliary feedwater system was recovered in a timely manner and public health and safety was maintained at all times.

Although feed and bleed is not a design requirement, the staff recognizes that a feed and bleed capability exists at most PWRs.

As part of the requirements developed after the TMI-2 accident, plants were required to develop procedures for managing events beyond the design basis events, including the effects of multiple failures. These procedures utilize all available equipment, not just safety-related equipment, in order to provide maximum core cooling capability. To cope with a loss of all feedwater event, operators are instructed to open all available pressure relief paths, e.g., the PORV, and actuate all available injection pumps, e.g., HPI and makeup. Analyses have been provided by the plants which examine this mode of cooling.

Based on the analyses received from the licensees, we have characterized the feed and bleed capability for the various plants as follows:

Type 1 - Plants which can feed and bleed at the high pressure safety valve/PORV setpoint. These plants have High Pressure HPI Pumps with shutoff head at 2700 to 2900 psi

[8 plants]

ANO-1
Crystal River 3
Oconee 1, 2 & 3
Rancho Seco
TMI-1
Maine Yankee

Question 5. (Continued)

Type 2 - Plants which are marginal for feed and bleed at the safety valve/PORV setpoint (HPI pump shutoff head approximately equal to PORV/safety valve relief pressure but can depressurize through the PORV and feed and bleed at lower pressure).

[29 Plants]

Beaver Valley 1 & 2
D.C. Cook 1 & 2
Farley 1 & 2
Haddam Neck
Sequoyah 1 & 2
Byron 1 & 2
North Anna 1 & 2
Salem 1 & 2
San Onofre 1
Trojan
Surry 1 & 2
Diablo Canyon 1 & 2
Zion 1 & 2
Callaway
McGuire 1 & 2
Catawba 1 & 2
Summer

Type 3 - Plants which can feed and bleed if operator depressurizes plant with PORVs (HPI shutoff head approximately 1600 psi).

[13 plants]

Ginna
Indian Point 2 & 3
Kewaunee
H. B. Robinson
ANO-2
Point Beach 1 & 2
Prairie Island 1 & 2
Turkey Point 1 & 2
Ft. Calhoun

TYPE 4 - PLANTS WHICH MAY OR MAY NOT BE ABLE TO SUCCESSFULLY FEED AND BLEED BY PORV DEPRESSURIZATION DUE TO LOW HPI SHUTOFF HEAD (APPROXIMATELY 1300 PSI) AND/OR SMALL PORV CAPACITY.

[7 PLANTS]

CALVERT CLIFFS 1 & 2
MILLSTONE 2
PALISADES
ST. LUCIE 1 & 2
YANKEE ROWE

IN SUMMARY, THE NRC STAFF ONLY RECOGNIZES FEED AND BLEED AS A DEFENSE IN DEPTH MEASURE FOR COPING WITH EVENTS BEYOND THE DESIGN BASIS. THIS MODE OF COOLING IS UTILIZED TO KEEP THE CORE COOLED WHILE MEASURES ARE TAKEN TO RESTORE FEEDWATER. THE SPECIFIC FEED AND BLEED CAPABILITY VARIES FROM PLANT TO PLANT, AND HAS BEEN STUDIED BY APPROPRIATE ANALYSES.

FOR DAVIS-BESSE, THE LICENSEE PROVIDED ANALYSES WHICH DEMONSTRATED THAT A LOSS OF FEEDWATER EVENT WOULD NOT RESULT IN CORE UNCOVERY IF THE OPERATOR MANUALLY INITIATED THE STARTUP FEEDWATER PUMP, ONE MAKEUP PUMP AND OPENED THE PORV WITHIN 30 MINUTES. SOME LIMITED CAPABILITY TO PERFORM FEED AND BLEED AT DAVIS-BESSE MAY EXIST USING BOTH OF THE MAKEUP PUMPS WITHOUT THE OPERATION OF THE

ELECTRIC STARTUP FEEDWATER PUMP. IT IS THE STAFF'S UNDERSTANDING THAT DAVIS-BESSE HAS PROCEDURES IN PLACE TO PERFORM FEED AND BLEED USING THE PORV, LOOP HIGH POINT VENTS, AND THE MAKEUP PUMPS (OR HPI PUMPS, AT LOWER PLANT PRESSURES). WE DO NOT, HOWEVER, HAVE ANY SUPPORTING ANALYSES FROM THE LICENSEE FOR THIS COOLING MODE.

QUESTION 6. DOES THE FAILURE OF THE PORV DURING THE DAVIS-BESSE INCIDENT RAISE QUESTIONS ABOUT THE ADEQUACY OF TESTING DONE IN ACCORDANCE WITH THE TMI ACTION PLAN?

ANSWER.

THE PORV OPERATION DURING THE INCIDENT WILL BE REPORTED BY THE NRC FACT-FINDING TEAM AS DISCUSSED IN THE ANSWER TO QUESTION 1. THE TEAM'S REPORT WILL ADDRESS THE POSSIBLE FAILURE OF THE VALVE AND THE PROBABLE CAUSE OF FAILURE. FURTHER, UPON REVIEW OF THE TEAM'S REPORT, THE TEST PROGRAM CONDUCTED ON THIS COMPONENT WILL BE REVIEWED AS TO ITS ADEQUACY.

QUESTION 6. (A) WAS THE SPECIFIC PORV MODEL USED AT DAVIS-BESSE TESTED AS PART OF THE TMI ACTION PLAN?

ANSWER.

IN RESPONSE TO THE REQUIREMENTS OF TMI ACTION PLAN ITEM II.D.1 AS CLARIFIED IN NUREG-0737 "PERFORMANCE TESTING OF BOILING WATER REACTOR AND PRESSURIZED WATER REACTOR RELIEF AND SAFETY VALVES," THE PWR OWNERS GROUP CONTRACTED WITH EPRI TO PERFORM A GENERIC TEST PROGRAM FOR PORVS AND SAFETY VALVES.

THE PORV AT DAVIS-BESSE IS A MODEL NO. HPV-SN PILOT OPERATED PORV WITH A NOMINAL BORE DIAMETER OF 1.5 INCHES MANUFACTURED BY CROSBY VALVE AND GAGE CO. AS PART OF THE EPRI GENERIC TEST PROGRAM, TWO CROSBY PORVS OF THE SAME MODEL NUMBER, BUT WITH A NOMINAL BORE SIZE OF 1.3 INCHES WERE TESTED. THE SPECIFIC DESIGN TESTED WAS TO BE USED AT NORTH ANNA UNITS 3 AND 4. IN ADDITION TO THE MINOR DIFFERENCE IN BORE DIAMETER, THERE WERE A FEW OTHER MINOR DIFFERENCES BETWEEN THE TESTED PORVS AND THE ONE USED AT DAVIS-BESSE. ACCORDING TO INFORMATION SUPPLIED BY THE MANUFACTURER, MOST OF THESE DIFFERENCES RELATE TO CHANGES MADE TO IMPROVE EASE OF MANUFACTURING THE VALVES. THE PRINCIPLE OF OPERATION AND ALL SIGNIFICANT VALVE INTERNALS FOR THE TESTED VALVES ARE CONSIDERED REPRESENTATIVE OF THE DAVIS-BESSE PORV, BASED ON NRC STAFF REVIEW OF THE EPRI TEST RESULTS. THERE WERE NO MODIFICATIONS NECESSARY ON THE PORV AS A RESULT OF THE EPRI TEST PROGRAM.

QUESTION 6. (B) HOW MANY OTHER PLANTS HAVE THE SAME MODEL PORV?

ANSWER.

CURRENTLY THERE ARE NO OTHER PLANTS EITHER OPERATING OR UNDER CONSTRUCTION THAT USE PORVS MANUFACTURED BY CROSBY VALVE AND GAUGE CO. NORTH ANNA 3 AND 4 WERE TO HAVE INSTALLED CROSBY PORVS, BUT THESE PLANTS HAVE BEEN CANCELLED.

QUESTION 6. (C) HOW MANY PORV FAILURES HAVE OCCURRED DURING OPERATION OR TESTING SINCE THE ACCIDENT AT THREE MILE ISLAND?

ANSWER.

THE SOURCE OF PORV RELIEF AND SAFETY VALVE FAILURE REPORTS IS DERIVED FROM ABOUT THREE YEARS OF REPORTING REQUIREMENTS FROM 1980 THROUGH 1983 IN ACCORDANCE WITH NUREG-0737, TMI ACTION PLAN ITEMS II.K.3.2 AND II.K.3.3. THIS REQUIRMENT WAS SUBSEQUENTLY DELETED VIA CHANGES TO THE NRC REGULATIONS ON LICENSEE EVENT REPORTING REQUIREMENTS (TITLE 10 CFR 50.73) WHICH WENT INTO EFFECT IN JANUARY 1984. SOME PLANTS, SUCH AS DAVIS BESSE, ARE STILL REQUIRED TO REPORT THESE FAILURES BECAUSE THEY HAVE NOT MODIFIED THEIR TECHNICAL SPECIFICATIONS, AS OF YET, TO REFLECT THE LESS RESTRICTIVE REQUIREMENTS OF THE NEW REGUALTIONS. BASED ON OUR REVIEW OF LER DATA, THE STAFF IS AWARE OF ABOUT FIFTEEN (15) EVENTS SINCE THE TMI-2 ACCIDENT WHERE A PORV FAILED TO OPEN OR CLOSE ON DEMAND, TWELVE (12) OF WHICH WERE DISCOVERED DURING SURVEILLANCE TESTING. ONLY ONE OF THESE 15 OCCURRED AFTER JANUARY 1984. OF THESE 15, TWO RESULTED IN MODIFICATIONS TO A FIRST OF A KIND PORV DESIGN, FIVE WERE CAUSED BY INSERVICE MECHANICAL DEGRADATION, AND THE BALANCE WERE CONTROL SYSTEM FAILURES. NONE OF THESE 15 EVENTS INVOLVED THE PORVS AT DAVIS-BESSE. IN ADDITION, THERE HAVE BEEN NUMEROUS INSTANCES REPORTED OF PORV SYSTEM DEGRADATION, SUCH AS EXCESSIVE LEAKAGE AND CONTROL SYSTEM MISADJUSTMENT OR MALFUNCTION. IN OCTOBER 1989 AND MARCH 1982, THE PORV AT DAVIS-BESSE WAS INSPECTED BECAUSE IT WAS LEAKING AND CORRECTIVE MAINTENANCE WAS PERFORMED.

QUESTION 7. DOES THE AUXILIARY FEEDWATER SYSTEM AT DAVIS-BESSE PROVIDE GREATER, EQUAL OR SMALLER MARGIN OF SAFETY THAN THE AUXILIARY FEEDWATER SYSTEM AT OTHER PRESSURIZED WATER REACTORS?

ANSWER.

THE AUXILIARY FEEDWATER SYSTEM AT DAVIS-BESSE DOES PROVIDE A SMALLER MARGIN OF SAFETY (HIGHER UNRELIABILITY) THAN THE AUXILIARY FEEDWATER SYSTEM AT MOST OTHER PWRS. RELIABILITY STUDIES FOR THE DAVIS-BESSE TWO PUMP, NON-DIVERSE DRIVE AFWS HAVE SHOWN A HIGHER UNRELIABILITY THAN FOR MOST OTHER PWRS. THE SMALLER MARGIN OF SAFETY IS BASED ON THE COMBINED CONDITIONS OF A SHORT STEAM GENERATOR DRY-OUT TIME, HAVING ONLY TWO AUXILIARY FEEDWATER PUMPS, AND RELIANCE ON STEAM FOR AUXILIARY FEED-WATER PUMP MOTIVE POWER SINCE NO DIVERSE POWERED (MOTOR-DRIVEN) AFW PUMP IS PROVIDED. THE LACK OF A THIRD DIVERSE AFW TRAIN DOES HAVE AN EFFECT ON OVERALL RELIABILITY OF THE AFWS. THE RELIABILITY STUDY FOR DAVIS-BESSE GIVES NO CREDIT FOR THE INSTALLED, NON-SAFETY GRADE, LOWER CAPACITY, ELECTRIC DRIVEN STARTUP PUMP WHICH IS TO BE UPGRADED WITH A HIGHER CAPACITY PUMP.

QUESTION 8. PROVIDE A HISTORY OF ANY PREVIOUSLY NOTED DIFFICULTIES OBSERVED WITH THE MAIN OR AUXILIARY FEEDWATER SYSTEMS AT DAVIS-BESSE SINCE 1979 AND ANY ACTIONS TAKEN IN RESPONSE.

ANSWER.

AUXILIARY FEEDWATER SYSTEM

THE TMI RELATED SHUTDOWN ORDER FOR DAVIS-BESSE REGARDING THIS SUBJECT WAS LIFTED ON JULY 6, 1979 AND THE UNIT WAS SYNCHRONIZED TO THE GRID ON JULY 12, 1979. SINCE JULY 12, 1979 THERE HAVE BEEN 48 LICENSEE EVENT REPORTS (LERS) RELATING TO PROBLEMS WITH THE AUXILIARY FEEDWATER SYSTEM AND THE STEAM FEEDWATER RUPTURE CONTROL SYSTEM.

THE LERS CAN BE RELATED TO SIMILAR OR REPETITIVE PROBLEMS ASSOCIATED WITH COMMON COMPONENTS OR TO SINGULAR EVENTS WITH NO APPARENT REPETITIVENESS. IN EACH CASE THE LICENSEE TOOK CORRECTIVE ACTION, BUT THE REPETITIVENESS OF CERTAIN PROBLEMS INDICATES THAT THE ROOT CAUSES WERE NOT RESOLVED. THE FOLLOWING IS A SUMMARY OF THE REPETITIVE PROBLEMS AND THE MORE SIGNIFICANT SINGULAR EVENTS BASED ON THE STAFF'S LER REVIEW (REFER TO TABLE ON PAGE 6).

AUXILIARY FEEDWATER SYSTEM TURBINE GOVERNORS

FIVE PROBLEMS WERE NOTED IN 1980, 1981, 1983 AND 1985. THE FIRST FOUR, WHICH OCCURRED IN 1980, 1981, AND 1983, WERE RELATED TO A SPEED CONTROL MECHANISM FOR SETTING TURBINE SPEED AND INVOLVED DRIVE CLUTCH WEAR AND ADJUSTMENT. AFTER THE 1983 PROBLEM THE SPEED CONTROL MECHANISMS WERE SUBSEQUENTLY MODIFIED BY THE VENDOR. FURTHER, DURING THE 1984 REFUELING OUTAGE A NEW HYDRAULIC GOVERNOR WAS INSTALLED ON AUXILIARY FEEDWATER SYSTEM TURBINE NO. 2 AS AN IMPROVED DESIGN. ADDITIONALLY, CHANGES WERE MADE TO THE VALVE LOGIC. DURING A REACTOR TRIP ON MARCH 23, 1985, THE NEW GOVERNOR SPEED RESPONSE WAS FOUND TO BE SLOW, REQUIRING A CHANGE TO THE SPEED BUSHING AND ELIMINATION OF CHANGES TO THE VALVE LOGIC THAT HAD BEEN INSTALLED DURING THE 1984 OUTAGE.

AUXILIARY FEEDWATER SYSTEM VALVES

PROBLEMS IDENTIFIED WITH VALVES CAN BE CLASSIFIED BOTH AS MECHANICAL AND ELECTRICAL.

DURING A 1982 REFUELING AUXILIARY FEEDWATER AND OTHER VALVES WERE FOUND MISALIGNED AND NOT PROPERLY LOCKED AND LOGGED. RESPONSE TO NON-COMPLIANCE RESULTED IN SIGNIFICANT TIGHTENING OF CONTROLS FOR LOCKED VALVES

FOUR MECHANICAL PROBLEMS IN 1979, 1983 AND 1984 INVOLVED LIMITORQUE (BRANDNAME) VALVE OPERATORS. THE TWO 1979 PROBLEMS INVOLVED IMPROPER ASSEMBLY OF VALVE OPERATORS AND ADJUSTMENTS OF TORQUE SWITCHES. THESE PROBLEMS WERE RESOLVED IN A REVISION TO THE MAINTENANCE PROCEDURE. TWO OTHER PROBLEMS INVOLVED A DIRTY VALVE STEM AND AN ADJUSTMENT TO A TORQUE SWITCH SETTING IN 1983 AND 1984 RESPECTIVELY. THE VALVE STEM WAS CLEANED AND THE TORQUE SWITCH SETTING WAS CHANGED.

FOUR ELECTRICAL PROBLEMS IN 1979 AND 1980 INVOLVED VALVE CONTROL RELAYS AND PRESSURE SWITCHES IN THE STEAM AND AUXILIARY FEEDWATER SYSTEM PUMP SUCTION LINES. THE DEFECTIVE COMPONENTS WERE REPLACED OR CORRECTED THROUGH MAINTENANCE ACTIVITIES.

FOUR OTHER ELECTRICAL PROBLEMS WITH VALVES HAVE BEEN IDENTIFIED. THESE WERE SPURIOUS CLOSURES IN 1980 AND 1982, A FAILED RELAY DRIVER BOARD, A FAILURE TO ADJUST A SPEED PROBE IN 1981 AND A BLOWN FUSE IN 1983. THE LICENSEE INVESTIGATED EACH OCCURRENCE AND CORRECTED THE PROBLEMS.

AUXILIARY FEEDWATER SYSTEM TURBINE OVERSPEED TRIP

TWO OVERSPEED TRIPS OF THE AUXILIARY FEEDWATER SYSTEM TURBINES WERE REPORTED IN 1983. ONE WAS INADVERTENT WHEN THE TRIP LINKAGE WAS BUMPED DURING MAINTENANCE. THE SECOND EVENT WAS ATTRIBUTED TO IMPROPER LATCHING OF THE MECHANICAL TRIP LINKAGE. PARTS OF THE LINKAGE WERE CLEANED AND THE SURVEILLANCE TEST PROCEDURE FOR THE AUXILIARY FEEDWATER SYSTEM WAS REVISED TO INCREASE CYCLING FREQUENCY OF THE TEST LINKAGE.

STEAM FEEDWATER RUPTURE CONTROL SYSTEM POWER SUPPLIES

EIGHT DC POWER SUPPLIES FAILURES OCCURRED FROM 1979 THROUGH 1982. THE POWER SUPPLIES WERE RETURNED TO THE VENDOR FOR ANALYSIS AND REPAIR.

AUXILIARY FEEDWATER SYSTEM STEAM GENERATOR HEADER

DURING EDDY CURRENT TESTING ON THE STEAM GENERATORS IN 1982, A DAMAGED INTERNAL RING HEADER WAS IDENTIFIED. THIS EVENT WAS CLASSIFIED AS A PROBLEM COMMON TO THIS B&W DESIGN. THE INTERNAL HARDWARE WAS STABILIZED IN PLACE AND AN EXTERNAL HEADER WAS INSTALLED.

AUXILIARY FEEDWATER SYSTEM PIPE RESTRAINTS

EARLY MARCH 1985, THE LICENSEE IDENTIFIED DAMAGED AUXILIARY FEEDWATER SYSTEM PIPE RESTRAINTS. THE LICENSEE ATTRIBUTED THE DAMAGE, IN PART, TO EXCESSIVE HYDRODYNAMIC FORCES RESULTING FROM MAIN STEAM SUPPLY VALVE CONTROL LOGIC CHANGES MADE DURING THE 1984 REFUELING OUTAGE. WHEN IT WAS DETERMINED THAT THE DAMAGE PROFILE MIGHT BE MORE EXTENSIVE A CONFIRMATORY ACTION LETTER WAS ISSUED BY THE NRC TO ADDRESS THE LICENSEE'S ACTIONS TO IDENTIFY THE CAUSES, SCOPE AND CONSEQUENCES. THE EVALUATION IS STILL IN PROGRESS.

MAIN FEEDWATER SYSTEM

PROBLEMS RELATED TO THE MAIN FEEDWATER PUMPS ARE NOT NORMALLY REPORTED VIA THE LICENSEE EVENT REPORT SYSTEM (LER). HOWEVER, REPETITIVE CONTROL PROBLEMS WITH THE MAIN FEEDWATER TURBINE LED THE LICENSEE TO REPLACE THE TURBINE HYDRAULIC GOVERNORS WITH ELECTRONIC GOVERNORS DURING THE 1984 REFUELING OUTAGE. SINCE THE INSTALLATION OF THE ELECTRONIC GOVERNORS THERE HAVE BEEN SEVERAL PUMP TRIPS DURING REACTOR TRIPS AND THE LICENSEE IS CONTINUING TO EVALUATE THIS PROBLEM.

QUESTION 8. (Continued)

TABLE Q. 8
REVIEW OF LERS
SUMMARY

DAVIS-BESSE

	YEAR						
	79*	80	81	82	83	84	85
Auxiliary Feedwater System							
Turbine Governor *(Pipe Restraint issue in 1985 LER)	--	1	2	--	1	--	1*
Inoperable Valve							
- Mechanical	2	--	--	--	1	1	--
- Electrical -- Couch Relays	1	1	--	--	--	--	--
-- Pressure Switches	--	2	--	--	--	--	--
-- Other	--	1	2	1	1	--	--
Valve Misalignment	--	--	--	2	--	--	--
Overspeed Trip	--	--	--	--	2	--	--
Steam Generator Header	--	--	--	1	--	--	--
Others	1	1	--	3	1	1	1
Steam Feedwater Rupture Control System							
Power Supply	2	1	1	4	--	--	--
Setpoint Drift	--	1	--	--	--	--	--
Component Failure	2	--	--	--	--	--	--
- MSIV Closed	--	--	--	1	--	1	--
Others	1	--	--	2	--	--	1

*Since July 11, 1979 restart after the TMI Order was lifted.

QUESTION 9. WHAT ARE THE GENERIC IMPLICATIONS AND LESSONS LEARNED FROM THE DAVIS-BESSE INCIDENT?

ANSWER.

THE GENERIC IMPLICATIONS AND LESSONS LEARNED FROM THE DAVIS-BESSE INCIDENT WILL BE IDENTIFIED AFTER AN INVESTIGATION OF THE INCIDENT IS COMPLETE. THEN THE NRC WILL DETERMINE WHAT APPROPRIATE CORRECTIVE ACTIONS ARE NECESSARY ON OTHER PLANTS.

QUESTION 10: In light of the Davis-Besse incident, is there any information of which the Commission is aware that would lead it to reconsider any of the positions taken by the NRC Staff, or in any of its own decisions, in the TMI restart proceeding? For example, in the TMI restart proceeding, the NRC staff contended that a total loss of feedwater was beyond the design basis and, therefore, capability to accomplish feed and bleed was not required.

ANSWER

There is no information as a result of the Davis-Besse incident of which the Commission is aware that would lead it to reconsider any of the positions taken by the staff or its own decisions in the TMI restart proceeding. However, this position could change when the report of the fact finding team is available and the results are evaluated.

Question 11: List those TMI Action Plan items directly relevant to the Davis-Besse incident and provide the current status of compliance. Specifically included in your response should be a detailed explanation of what actions were taken and when in response to those TMI Action Plan items concerning the auxiliary feedwater system and pilot operated relief valve. Your response should clearly identify those relevant Action Plan items that have not been fully implemented and explain when each item was originally scheduled to have been completed and the reason it remains outstanding.

Answer.

The licensee has fully implemented all required TMI Action Plan items except Items 1.D.1 (Control Room Design Reviews) and II.F.2 (Instrumentation for Detection of Inadequate Core Cooling). The status of the implementation of these two items by the licensee and the Staff's post-implementation reviews are addressed in Table Q 11. In addition, five of the listed TMI Action items relevant to the Davis-Besse incident are still active regarding the Staff's post-implementation reviews.

TABLE G. 11

TMI ACTION PLAN ITEMS DIRECTLY RELEVANT TO THE DAVIS BESSE INCIDENT AND STATUS OF COMPLIANCE

ACTION PLAN ITEM	TITLE	IMPLEMENTATION AND REVIEW STATUS
I.A.1.1	SHIFT TECHNICAL ADVISOR	COMPLETE
I.A.1.2	SHIFT SUPERVISOR RESPONSIBILITIES	COMPLETE
I.A.1.3	SHIFT MANNING	COMPLETE
I.A.2.1	IMMEDIATE UPGRADING OF RO & SRO TRAINING AND QUALIFICATIONS	COMPLETE
I.C.1	SHORT-TERM ACCIDENT & PROCEDURES REVIEW	CONSISTENT WITH OUR CONFIRMATORY ORDER ON SUPPLEMENT 1 TO NUREG-0737, THE LICENSEE HAS IMPLEMENTED THE EMERGENCY PROCEDURES (ATOG). STAFF REVIEW IS SCHEDULED FOR COMPLETION BY JUNE 31, 1986.
I.C.5	FEEDBACK OF OPERATING EXPERIENCE	COMPLETE

QUESTION 11. (CONTINUED) - 3 -

I.D.1	CONTROL-ROOM DESIGN REVIEWS	CONSISTENT WITH OUR CONFIRMATORY ORDER ON SUPPLEMENT 1 TO NUREG-0737, THE LICENSEE SUBMITTED A SUMMARY REPORT AND PROPOSED A SCHEDULE FOR IMPLEMENTATION BY THE COMPLETION OF THE 7TH REFUELING OUTAGE ABOUT 4 YEARS FROM NOW. THE SUBMITTALS ARE UNDER REVIEW BY THE STAFF.
I.D.2	PLANT-SAFETY-PARAMETER DISPLAY CONSOLE	LICENSEE IMPLEMENTATION IS COMPLETE. STAFF REVIEW SCHEDULED TO BE COMPLETED BY 9/30/85.
II.D.1	RELIEF & SAFETY-VALVE TEST REQUIREMENTS	3/31/86 - LICENSEE IMPLEMENTATION IS COMPLETE. STAFF REVIEW SCHEDULED TO BE COMPLETED BY 3/31/86.
II.D.3	VALVE POSITION INDICATION	COMPLETE
II.E.1.1	AUXILIARY FEEDWATER SYSTEM EVALUATION	COMPLETE
II.E.1.2	AUXILIARY FEEDWATER SYSTEM INITIATION & FLOW	COMPLETE

II.F.2	INSTRUMENTATION FOR DETECTION OF INADEQUATE CORE COOLING	ALL ASPECTS OF THE MODIFICATION REQUIRED BY OUR DECEMBER 1982 ORDER ARE INSTALLED EXCEPT FOR: CONTINUOUS VENT FROM THE REACTOR VESSEL HEAD TO THE HOT LEG; AND REPLACEMENT OF NON-QUALIFIED ELECTRICAL CONNECTORS TO THE CORE EXIT THERMOCOUPLES WHICH ARE SCHEDULED FOR IMPLEMENTATION DURING THE 1986 REFUELING OUTAGE (SPRING OF 1986). THE STAFF'S POST-IMPLEMENTATION REVIEW IS SCHEDULED FOR COMPLETION BY 9/30/86.
II.G.1	POWER SUPPLIES FOR PRESSURIZER RELIEF VALVES, BLOCK VALVES, & LEVEL INDICATORS	COMPLETE
II.K.1	IE BULLETINS	COMPLETE
II.K.2	ORDERS ON B&W PLANTS	COMPLETE
II.K.3	FINAL RECOMMENDATIONS, B&O TASK FORCE	LICENSEE IMPLEMENTATION IS COMPLETE. STAFF REVIEW OF II.K.3.30 SB LOCA METHODS SCHEDULED FOR 12/31/86 AND II.K.3.31 COMPLIANCE WITH 10 CFR 50.46 SCHEDULED FOR 1/31/87.

THE ACTIONS THAT WERE TAKEN CONCERNING THE AUXILIARY FEEDWATER SYSTEM AND THE PILOT OPERATED RELIEF VALVE (PORV) AND WHEN THESE ACTIONS WERE COMPLETED ARE DISCUSSED BELOW.

PORV

II.K.2.14 LIFT FREQUENCY OF PORV AND SAFETY VALVES.

THE LICENSEE SUBMITTED THE ANALYSES REQUIRED TO DETERMINE THE EXPECTED FREQUENCY OF PORV ACTUATION FOR OVERPRESSURE TRANSIENTS ON JANUARY 30, 1981. THIS ITEM IS COMPLETE. THIS SUBMITTAL WAS REQUIRED UNDER ITEM II.K.3.7.

II.K.3.1 AUTO PORV ISOLATION

AUTOMATIC PORV ISOLATION WAS NOT SHOWN TO BE REQUIRED BASED ON ANALYSES SUBMITTED FOR II.K.3.2.

II.K.3.2 REPORT ON OVERALL SAFETY EFFECT OF PORV ISOLATION SYSTEM

THIS ITEM REQUIRED AN ANALYSIS OF THE PROBABILITY OF A SMALL BREAK LOCA CAUSED BY A STUCK OPEN PORV OR SAFETY VALVE AND SHOULD CONSIDER POST TMI IMPROVEMENTS TO THE PORVS. THE ANALYSIS WAS SUBMITTED JANUARY 30, 1981 AND THIS ITEM IS COMPLETE. THERE WERE NO IMPROVEMENTS NEEDED ON THE PORV.

II.K.3.7 EVALUATION OF PORV OPENING PROBABILITY DURING OVERPRESSURE TRANSIENT

(REFER TO ITEM II.K.2.14. ABOVE)

II.D.1 RELIEF AND SAFETY VALVE TESTING PROGRAM

(REFER TO ANSWER TO QUESTION 6)

II.G.1 POWER SUPPLIES FOR PRESSURIZER RELIEF VALVES, BLOCK VALVES, AND LEVEL INDICATOR

THIS ITEM REQUIRES THAT COMPONENTS ASSOCIATED WITH THE PORV AND PORV BLOCK VALVES BE CAPABLE OF BEING POWERED FROM EITHER OFFSITE POWER OR FROM THE EMERGENCY POWER SOURCE IF OFFSITE POWER IS NOT AVAILABLE. THE DAVIS BESSE LICENSEE CONFIRMED ON JANUARY 18, 1980 THAT THE PORV AND BLOCK VALVE COMPONENTS HAVE THIS CAPABILITY.

AUXILIARY FEEDWATER SYSTEM

II.E.1.1 AUXILIARY FEEDWATER EVALUATIONS

THE NRC REQUIREMENT IS THAT EACH LICENSEE EVALUATE ITS AUXILIARY FEEDWATER (AFW) SYSTEMS USING THE STANDARD REVIEW PLAN AND ASSOCIATED BRANCH TECHNICAL POSITION AND PROVIDE JUSTIFICATION FOR ANY DIFFERENCES. THEY ARE ALSO REQUIRED TO PROVIDE A SIMPLIFIED AFW RELIABILITY ANALYSIS AND REEVALUATE THEIR AFW SYSTEM DESIGN FLOW RATE BASIS TO ENSURE ADEQUATE AFW FLOW UNDER VARIOUS ACCIDENT CONDITIONS. ANY AREA FOR WHICH INSUFFICIENT JUSTIFICATION EXISTS MUST BE UPGRADED. PRE-IMPLEMENTATION REVIEWS HAVE BEEN COMPLETED ON ALL THE PLANTS AND A POST-IMPLEMENTATION REVIEW WILL BE CONDUCTED IN ACCORDANCE WITH NUREG-0737.

DAVIS-BESSE HAS SUBMITTED ITS SIMPLIFIED AFW RELIABILITY ANALYSIS, HAS EVALUATED ITS AFW SYSTEMS AGAINST THE STANDARD REVIEW PLAN AND ASSOCIATED BRANCH TECHNICAL POSITION, AND HAS REEVALUATED ITS AFW SYSTEM DESIGN FLOW RATE CRITERIA TO ENSURE ADEQUATE AFW FLOW UNDER VARIOUS ACCIDENT CONDITIONS. THESE EVALUATIONS IDENTIFIED A NUMBER OF CORRECTIVE ACTIONS.

Davis-Besse completed all plant modifications required as a result of this review in 1980. The original AFW system at Davis-Besse was designed as safety grade, so few modifications were necessary for this unit to meet this requirement. However, three open items remain in the NRC review regarding the contents of the Davis-Besse Technical Specifications for the AFW system. The licensee has proposed the required changes to the Technical Specifications and they are being reviewed.

II.E.1.2 Auxiliary Feedwater System Initiation

The NRC requirement is for all licensees to provide a control grade automatic initiation feature for their AFW system and then upgrade it to meet safety grade requirements. Licensees are also required to install safety grade indication of auxiliary feedwater flow to each steam generator in the control room.

The licensee for Davis-Besse, states that it has installed and tested the system modifications and that its systems are operable. The licensee also implemented operating procedures and completed operator training. All modifications were completed by August 1982.

II.K.2.8 Upgrade of Auxiliary Feedwater System

The licensee was required to comply with certain short term actions prior to being allowed to return to operation following the TMI-2 accident. The evaluation of the licensee short term actions is included with the

JULY 6, 1979 NRC LETTER SUPPLIED IN RESPONSE TO QUESTION 12. THE LONG TERM ITEMS WERE EVALUATED UNDER NUREG-0737 ITEMS II.E.1.1 AND II.E.1.2 AND THESE ITEMS ARE COMPLETE AS NOTED ABOVE.

II.K.2.19 SEQUENTIAL AUXILIARY FEEDWATER FLOW ANALYSIS

THE REQUIRED ANALYSES WERE SUBMITTED FOR REVIEW FEBRUARY 5, 1980. NO MODIFICATIONS WERE REQUIRED AND THIS ITEM IS COMPLETE. THE ITEM ALSO REQUIRES THAT PRESSURIZER LEVEL INDICATION CHANNELS BE POWERED FROM THE VITAL INSTRUMENT BUS WHICH CAN BE POWERED FROM EITHER THE OFFSITE POWER SOURCE OR THE EMERGENCY POWER SOURCE WHEN OFFSITE POWER IS NOT AVAILABLE. (ALSO SEE II.G.1 UNDER "PORV" ABOVE). THE DAVIS-BESSE PLANT HAS THIS CAPABILITY.

IN ADDITION TO ACTIONS NOTED ABOVE UNDER THE RELEVANT TMI ACTION ITEMS, THE LICENSEE HAS ALSO TAKEN THE INITIATIVE TO MAKE CHANGES TO UPGRADE THE AFW SYSTEM BASED ON THE RELIABILITY ANALYSIS SUBMITTED TO THE NRC IN DECEMBER 1981. UPGRADES ARE ONGOING WITH SOME SCHEDULED FOR THE 1986 REFUELING OUTAGE.

QUESTION 12. IN NUREG-0667, "TRANSIENT RESPONSE OF BABCOCK & WILCOX-DESIGNED REACTORS" (MAY 1980), THE NRC SPECIFICALLY RECOMMENDED THAT DAVIS-BESSE IMPROVE SAFETY BY INSTALLING A DIVERSE DRIVE AUXILIARY FEEDWATER PUMP. ACCORDING TO PRELIMINARY INFORMATION PROVIDED BY THE NRC STAFF, THIS RECOMMENDATION WAS SUSPENDED AND IS NOW PENDING FOR THE NEXT REFUELING OUTAGE IN 1986. PLEASE PROVIDE A DETAILED HISTORY OF ALL ACTIONS TAKEN IN RESPONSE TO THIS RECOMMENDATION AND ALL ACTIONS SINCE 1979 TAKEN CONCERNING THE AUXILIARY FEEDWATER SYSTEM AT DAVIS-BESSE. YOUR RESPONSE SHOULD INCLUDE A LISTING OF ALL MEETINGS, COPIES OF ALL CORRESPONDENCE BETWEEN NRC AND THE LICENSEE AND DOCUMENTS CONCERNING THE AUXILIARY FEEDWATER SYSTEM SINCE 1979.

ANSWER:

EVEN BEFORE THE B&W REACTOR TRANSIENT TASK FORCE ISSUED ITS RECOMMENDATION FOR A DIVERSE DRIVE AUXILIARY FEEDWATER (AFW)

PUMP AT DAVIS-BESSE, THE STAFF HAD RECOGNIZED THAT AFW PUMP POWER DIVERSITY WOULD LIKELY IMPROVE AFW SYSTEM RELIABILITY. THIS WOULD REDUCE THE VULNERABILITY OF THE PLANT TO LOSS OF DECAY HEAT REMOVAL CAPABILITY THROUGH LOSS OR DELAYED START OF THE STEAM TURBINE DRIVEN AFW PUMPS WHICH COULD RESULT IN STEAM GENERATOR DRYOUT. THE STAFF IDENTIFIED ITS CONCERN IN THE SAFETY EVALUATION (SE) WHICH WAS ATTACHED WITH THE JULY 6, 1979 LETTER AUTHORIZING RESTART FOLLOWING THE TMI-2 ACCIDENT. THE STAFF NOTED IN THE SE THAT A 100% CAPACITY MOTOR-DRIVEN AFW PUMP WOULD BE REQUIRED, BUT INDICATED THAT OTHER ALTERNATIVES (TO IMPROVE RELIABILITY) COULD BE ACCEPTABLE. THE STAFF NOTED, IN ITS SE, THAT THE LICENSEE HAD AGREED TO CONTINUE TO REVIEW THE PERFORMANCE OF THE AFW SYSTEM FOR ASSURANCE OF RELIABILITY AND PERFORMANCE, AND THAT STAFF REQUIREMENTS WOULD BE HELD IN ABEYANCE CONSISTENT WITH THIS AGREEMENT.

ON JANUARY 4, 1980, TOLEDO EDISON SUBMITTED A RELIABILITY ANALYSIS AS REQUESTED BY THE NRC ON AUGUST 21, 1979. THE PRINCIPAL RESULT OF THE STUDY WAS TO IDENTIFY DOMINANT CONTRIBUTORS TO AFW SYSTEM UNRELIABILITY, HOWEVER, SPECIFIC MODIFICATIONS FOR IMPROVEMENT WERE NOT EXAMINED. THIS RELIABILITY STUDY LATER BECAME A REQUIREMENT UNDER NUREG-0737, ITEM II.E.1.1 AND BECAME PART OF THAT REVIEW.

IN MAY 1980, THE B&W REACTOR TRANSIENT TASK FORCE MADE A RECOMMENDATION, IN NUREG-0667, INCLUDING: "INSTALLATION OF A DIVERSE DRIVEN AFW PUMPS SHOULD BE EXPEDITED AT THE DAVIS-BESSE 1 FACILITY." THE RECOMMENDATIONS IN NUREG-0667 WERE REVIEWED BY THE DIVISION OF SAFETY TECHNOLOGY IN RESPONSE TO A REQUEST BY THE DIRECTOR OF NRR ON MAY 21, 1980. DST EVALUATED THE SAFETY SIGNIFICANCE OF EACH RECOMMENDATION AND ASSIGNED PRIORITIES FOR IMPLEMENTATION. THE RECOMMENDATION FOR DIVERSE DRIVE AFW PUMPS AT DAVIS BESSE 1 WAS ASSIGNED PRIORITY 1 WITH THE RECOMMENDATION THAT IT SHOULD BE IMPLEMENTED BY ORDER TO THE LICENSEE. (MEMO R. MATTSON TO H. DENTON OF AUGUST 8, 1980).

IN 1980 TOLEDO EDISON COMPANY HAD INITIATED STUDIES RELATING TO HOW THE RELIABILITY OF THE AFW SYSTEM COULD BE IMPROVED AND, IN JANUARY OF 1981, THE LICENSEE PROPOSED TO THE NRC THAT A RISK REDUCTION COMPARISON BE USED TO EVALUATE VARIOUS ALTERNATIVES FOR IMPROVING RELIABILITY. THE LICENSEE ALSO INDICATED THAT CERTAIN DESIGN FEATURES INCLUDED IN THE DAVIS BESSE FACILITY WERE IGNORED OR NOT CONSIDERED IN THE STAFF'S PREVIOUS DETERMINATION THAT A DIVERSE DRIVE AFW TRAIN WAS REQUIRED. THE NRC INFORMED THE LICENSEE IN THE SPRING OF 1981 THAT THE STAFF REQUIREMENT FOR IMPROVING RELIABILITY MAY BE SATISFIED BY AN

UPGRADE OF THE EXISTING STARTUP FEED PUMP (SUFP). ALSO BY JUNE 1981, THE IMPLEMENTATION PLAN FOR NUREG-0667 (MEMO D. EISENHUT TO H. DENTON, JUNE 3, 1981) REFLECTED THE DECISION TO AWAIT THE RESULTS OF A RELIABILITY STUDY WHICH THE LICENSEE HAD UNDERWAY, TO DETERMINE SYSTEM MODIFICATION REQUIREMENTS INSTEAD OF ISSUING AN ORDER TO INSTALL A DIVERSE DRIVE PUMP.

THE LICENSEE'S RELIABILITY STUDY WAS SUBMITTED DECEMBER 31, 1981, AND CONCLUDED THAT GREATER IMPROVEMENT IN RELIABILITY COULD BE ACHIEVED BY OTHER LESS COSTLY, MODIFICATIONS TO THE AFW SYSTEM THAN COULD ACHIEVED BY THE ADDITION OF A THIRD TRAIN. THE STUDY WAS REVIEWED IN 1982 BY THE NRC AND ITS CONTRACTORS. SOME MODIFICATIONS IDENTIFIED IN THE LICENSEE'S REPORT HAVE BEEN MADE AND ARE INCLUDED IN THE ANSWER TO QUESTION 13. THE RESULTS OF THE STAFF/CONTRACTOR REVIEW OF THE DAVIS BESSE RELIABILITY STUDY WAS TRANSMITTED FROM DST TO DSI ON FEBRUARY 4, 1983, AND CONCLUDED THAT AN INDEPENDENT THIRD TRAIN WOULD LIKELY IMPROVE THE AFW SYSTEM RELIABILITY.

IN 1982-1983, THE NRR STAFF WAS INVOLVED IN A GENERIC EFFORT REGARDING THE UPGRADING OF AFW SYSTEMS IN OPERATING PWRS. THIS

EFFORT STEMMED FROM THE BULLETINS AND ORDERS (B&O) TASK FORCE REVIEWS AND RECOMMENDATIONS IN NUREG-0611 AND IN NUREG-0635 TO IMPROVE AFW SYSTEM RELIABILITY. DSI DEVELOPED A DRAFT CRGR PACKAGE CONCERNING GENERIC BACKFITTING REQUIREMENTS FOR UPGRADING AUXILIARY FEEDWATER SYSTEMS IN OPERATING PLANTS (ISSUED FOR NRR STAFF COMMENT BY R. MATTSON ON AUGUST 22, 1983).

NRR STAFF REVIEW AND COMMENT ON THE PROPOSED CRGR PACKAGE CONTINUED FOR THE REMAINDER OF 1983. AT THIS TIME, ONLY FOUR PLANTS (DAVIS BESSE, TURKEY POINT 3 AND 4, AND HADDAM NECK) LACKED ELECTRIC DRIVEN AFW PUMPS. COMPLETION OF THE NRR STAFF ACTION ON THE PROPOSED CRGR PACKAGE WAS DELAYED PENDING RESOLUTION OF JUSTIFICATION FOR THE PROPOSED TECHNICAL POSITION.

COMPLETION OF STAFF ACTION ON THE DAVIS BESSE RELIABILITY STUDY WAS HELD IN ABEYANCE THROUGHOUT 1983 WHILE STAFF CONSIDERATION OF THE CRGR PACKAGE TO BE SUBMITTED WAS IN PROGRESS. ON APRIL 23, 1984, THE STAFF SER AND CONTRACTOR EVALUATION OF THE DAVIS BESSE RELIABILITY STUDY WAS TRANSMITTED TO TOLEDO EDISON. THE STAFF CONCLUDED THAT THE DAVIS BESSE AFW SYSTEM IS IN THE LOW RELIABILITY RANGE COMPARED WITH AFW SYSTEMS OF OTHER PWR PLANTS.

On July 18, 1984, DSI indicated that, since progress on the proposed CRGR package was delayed, the staff should resume discussion with Toledo Edison regarding the issue of a diverse AFW pump without waiting for resolution of the CRGR package. The CRGR package has not yet been submitted to CRGR for consideration. On September 19, 1984, the staff met with Toledo Edison to discuss the AFW pump upgrade. At this meeting Toledo Edison committed to install a new startup pump in the turbine building based on other safety concerns described below.

In mid-1984, the licensee discovered that unanalyzed high-energy and moderate-energy pipe line breaks related to the use of the startup feedwater pump could jeopardize the safety related AFW pumps. The licensee determined that these hazards would be corrected by replacing the electric startup pump with a new, electrically driven pump relocated in the turbine building. The new pump would be sized to provide the flow of at least one AFW pump, could be supplied with power from the diesel generator, and could be used as a 100% capacity electric motor driven AFW pump to satisfy diversity requirements. However, the startup pump installation would not be safety grade.

The new startup feedwater pump is required, by license condition issued January 8, 1985, to be installed and made operational before

STARTUP FROM THE NEXT REFUELING OUTAGE (SCHEDULED FOR SPRING 1986). THE ATTACHED LISTING IDENTIFIES DOCUMENTATION RELATED TO THE DIVERSE-DRIVEN AFW PUMP AT DAVIS-BESSE. COPIES OF THE DOCUMENTS ARE PROVIDED IN ENCLOSURE 1.

COMMISSIONER ASSELSTINE ADDS THE FOLLOWING:

THE DAVIS BESSE EVENT, THE RESPONSES TO THIS QUESTION AND TO QUESTION 13 SUGGEST THERE ARE FLAWS IN THE APPROACH BEING TAKEN TO ACHIEVING AN ACCEPTABLE LEVEL OF SAFETY. THE RESPONSES RAISE QUESTIONS REGARDING: (A) THE USEFULNESS OF THE METHODOLOGIES FOR PERFORMING COST-BENEFIT ANALYSES, (B) WHETHER QUANTITATIVE SAFETY ANALYSES ARE REVEALING THE ACTUAL WEAK SPOTS IN SAFETY SYSTEMS, AND (C) THE NRC DECISION-MAKING PROCESS IN GENERAL.

TABLE Q. 12
DOCUMENTATION AND MEETINGS RELATED TO THE DAVIS BESSE AUXILIARY FEEDWATER SYSTEM REVIEW

Date	Description	Remarks
May 16, 1979 (external)	Commission Shutdown Order	NRC issued an Order requiring licensee to take various actions to improve the capability and reliability of Davis-Besse to respond to transients. Includes requirements for certain improvements in the AFW System.
May 22, 1979	Letter from Toledo Edison (Mr. Poe) to NRR (R. Reid) Transmitting Vol. VI of "Evaluation of Transient Behavior and Small Reactor Coolant System Breaks in the 177 Fuel Assembly Plants"	Forwards plant specific analysis of small break behavior at Davis-Besse.
May 23, 1979	Letter from Toledo Edison (Mr. Poe) to NRR (R. Reid) Transmitting Operating Procedure Matrix	Transmits operating procedure matrix.
May 23, 1979	Letter from Toledo Edison (Mr. Poe) to NRR (R. Reid) concerning the AFW System	Discusses overall reliability of AFW system and adequacy of AFW system capacity.
June 15, 1979	Letter from Toledo Edison (Mr. Poe) to H. Denton (D/NRR) concerning the AFW system	Transmits a report titled "Analysis of a Loss of Feedwater Transient for the Davis-Besse Nuclear Power Station, Unit 1".
June 23, 1979 (external)	Letter from Toledo Edison to R. Reid (ORB4/DL) transmitting information requested by Mazetis (NRC)	Transmitted information demonstrating capability of a dry steam generator to drive AFW turbine after loss of feedwater. Also provides analysis of capability to start AFW turbine 30 minutes after loss-of-feedwater.
July 6, 1979	Letter from NRR (H. Denton) to Toledo Edison (Mr. Roe) Transmiting Safety Evaluation on Response to NRC Shutdown Order of May 16, 1979	Letter permits resumption of operations and transmits SER on Toledo Edison responses and actions relating to the Shutdown Order. SER includes statements that the staff would require plant modification to provide the greater diversity offered by a 100% capacity motor-operated AFW pump, or an alternative acceptable to the staff.

249

Date	Description	Remarks
August 21, 1979 (external)	Letter from D. Ross (Bulletin & Order Task Force Director) to All B&W Operating Plants except TMI-1 and 2, re: IDENTIFICATION AND RESOLUTION OF LONG-TERM GENERIC ISSUES RELATED TO THE COMMISSION ORDER OF MAY 1979	This letter discusses organizational difficulties in obtaining required long term responses to Commission's May 1979 orders and sets out plan and schedules for obtaining required submittals.
January 4, 1980 (external)	Letter from Toledo Edison to R. Reid (ORB#4/DL) responding to NRC letter of August 21, 1979	Submits generic report on "Auxiliary Feedwater Systems Reliability Analyses for B&W Plants", BAW 1584, and draft plant specific analysis for Davis Besse. Report identifies dominant contributors to AFW system unreliability including AC dependency of motor-operated valves and system unavailability resulting from outages for preventive maintenance.
May 1980 (external)	NUREG-0667 "TRANSIENT RESPONSE OF B&W DESIGN REACTORS"	The B&W Reactor Transient Response Task Force recommended that, "Installation of a diverse-driven AFW pump should be expedited at the Davis-Besse 1 facility."
May 21, 1980 (internal)	Memo to H. Denton (NRR) to R. Mattson (D/DST) re: FINAL REPORT OF THE B&W REACTOR TRANSIENT RESPONSE TASK FORCE	Requests review, evaluation, and assignment of priorities for implementing recommendations of NUREG-0667.
August 8, 1980 (internal)	Memorandum from R. Mattson (D/DST) to H. Denton (NRR) "REVIEW OF FINAL REPORT OF THE B&W REACTOR TRANSIENT RESPONSE TASK FORCE" (NUREG-0667)	Responds to May 21, 1980 request to review NUREG-0667 and provide evaluation of the safety significance of the recommendations. Urges that the recommendation in NUREG-0667 (May 1980) that a motor-driven AFW pump should be required at Davis-Besse be implemented by issuing an order to the facility operating license. Also recommends that the Order require an analysis of the alternate cooling scheme proposed by licensee if all feedwater is lost to show the core is adequately protected.

Date	Description	Remarks
September 3, 1980 (internal)	Memorandum P. Check (AD/DSI) to T. Novak (AD/DL) re; DAVIS BESSE UNIT 1 AUXILIARY FEEDWATER SYSTEM RELIABILITY.	Provides status of review on Item II.E.1.1 of NUREG 0660 regarding AFW system. Identifies concern with dependency of both AFW pumps on steam. Includes a request for additional information including a request for the licensee to state plans for installing a third AFWS train no depending upon steam.
November 1980 (external)	NUREG-0737 "CLARIFICATION OF TMI ACTION PLAN REQUIREMENTS"	Issued to all licensees of operating plants, applicants for operating licenses, and holders construction by accompanying §50.54f letter.
September 11, 1980 (internal)	Memo from D. Garner (ORB#4/DL) to T. Novak (ADOR/DL) TECO's INTENTIONS WITH RESPECT TO THE ADDITION OF A DIVERSE POWERED AUXILIARY FEEDWATER PUMP	Discusses reasons for delay of Toledo Edison response on the third AFW pump. Concludes NRC should give Toledo Edison time to complete their studies and submit proposal regarding the third AFW pump.
January 23, 1981 (external)	Letter from Toledo Edison to R. Reid (ORB#4/DL) responding to July 6, 1979 letter and SER	Responds to NRC letter of July 6, 1979 and accompanying SER regarding diverse powered AFW pump. Indicates Toledo Edison has been studying the issue and evaluating various options to resolve the issue. Claims the staff has ignored plant features in establishing need for third pump and that this predetermines the need for diverse power capability. Proposes a risk reduction comparison to evaluate various alternatives.
March 5, 1981	Meeting with Toledo Edison	To discuss addition of third, diverse powered, AFW pump.
March 6, 1981 (internal)	Memo D. Eisenhut (D/DL) to S. Hanauer (D/DHFS), D. Ross (D/DSI), R. Vollmer (D/DE), and T. Murley (D/DST) re: NUREG-0667 IMPLEMENTATION PLAN	Transmits the NRR preliminary plan for implementing NUREG-0667 recommendations. Indicates that Item 3, Davis Besse Diverse Drive AFW, is to be implemented by Order.

Date	Description	Remarks
April 2, 1981 (external)	Letter from J. Stolz (ORB#4/DL) to Mr. Crouse (Toledo Edison) presenting Evaluation of Submittals in Response to NUREG-0737 Item II.E.1.1 and Comments on AFW Pump Power Diversity	Transmits request for additional information related to actions to improve AFW system reliability. Requests licensee to state plans and schedule for providing third AFW train with diverse motive power. Suggests emphasis be placed on upgrade of the startup feedwater train to provide diversity and improve reliability. Upgrade would not have to satisfy same seismic design requirements as existing AFW system and all ESF standards.
May 22, 1981 (external)	Letter from Toledo Edison to J. Stolz (ORB#4/DL) Indicates Intent to Submit PRA on the AFW System	Responds to NRC letter of April 2, 1981. A study to identify dominant failure contributors is underway. The study will identify dominant failure contributors to system unavailability. Commits to upgrades of systems based on study results. Study to be submitted July 1981. Plans and schedule for AFW system and/or startup feedwater pump to be discussed when study is completed. (This study was submitted December 31, 1981.)
June 3, 1981 (internal)	Memo D. Eisenhut (D/DL) to H. Denton (NRR) re: NUREG-0667 TRANSIENT RESPONSE OF B&W DESIGNED REACTORS - IMPLEMENTATION PLAN	Transmits the implementation plan for NUREG-0667 recommendations. Indicates that the issuance of an Order relating to the installation of a diverse-drive AFW pump at Davis Besse is postponed until a risk study is completed by the licensee. Study is due June 1981. (The study was actually submitted December 31, 1981.)

Date	Description	Remarks
June 29, 1981 (internal)	Memo T. Murley (D/DST) to H. Denton (NRR) re: Use of a Reliability Criterion in the Standard Review Plan for the Auxiliary Feedwater System	Proposes a revised standard'review plan for the AFW system.
July 28, 1981 (external)	Letter J. Stolz (ORB4/DL) to Toledo Edison Company Requesting Additional Information for Item II.E.1.1	Forwards request for additional information relating to AFW automatic initiation and flow indication.
September 16, 1981 (external)	Letter from Toledo Edison to J. Stolz (ORB#4/DL) Responding to July 28, 1981 Letter	Lists some improvements made or planned for the AFW system. Letter was in response to July 28, 1981 letter Stolz (ORB#4/DL) to Toledo Edison requesting additional information.
December 31, 1981 (external)	Letter from Toledo Edison to T. Novak (ADOR/DL) Submits report titled "Auxiliary Feedwater System Reliability Analysis - Final Report"	Identifies system modifications to improve reliability. Concludes necessary reliability improvements can be achieved without adding third pump. Addition of third train AFW would cost $1.2 million and have a figure-of-merit of 15 vs. the "Analysis Based" improvements cost of $300,000 for a figure-of-ment of 24. Licensee commits to specific improvements upon receipt of NRC concurrence with the approach. States Toledo Edison Company has no plans for the third train configuration.
February 4, 1983 (internal)	Memo A. Thadani (RRAB/DST) to O. Parr (ASB/DSI) re: EVALUATION OF THE RELIABILITY STUDY FOR DAVIS BESSE UNIT 1 UPGRADED AUXILIARY FEEDWATER SYSTEM.	The memorandum transmits an evaluate based on a Brookhaven National Laboratory review of Toledo Edison Co. reliability study of the Davis Besse AFW system submitted December 31, 1981). Concludes that independent third train will likely improve AFW system unavailability to acceptable range. Elimination of common cause and single point failures will improve AFW unreliability by factor of 2. Davis-Besse AFWS unavailability is estimated to be in low reliability range outside the SRP numerical criteria.
March 1, 1983 (internal)	Memo from F. Rowsome (AD/DST) to O. Parr, et al, DAVIS BESSE EMERGENCY FEEDWATER SYSTEM	Comments on February 4, 1983 Thadani memo above. Restates recommendation that NRR should require installation of a third, qualified, motor-driven AFW pump at Davis-Besse. Notes that 300 GPM of feedwater with PORV lift would save the core.

Date	Description	Remarks
August 22, 1983 (internal)	Memo from R. Mattson (D/DSI) to D. Eisenhut, et al, REQUEST FOR COMMENTS ON DRAFT CRGR PACKAGE CONCERNING REQUIREMENTS FOR UPGRADING AUXILIARY FEEDWATER SYSTEMS IN OPERATING PLANTS	Transmits Draft CRGR package for review and requests comment. Action would require compliance with diverse-drive AFW pump power and AFW system unavailability criteria.
August 26, 1983	Handwritten memo concerning the above August 22, 1983 memo	Requests a meetig to discuss the above August 22, 1983 memo.
August 29, 1983 (internal)	Memo from L. Rubenstein (AD/DSI) to G. Lainas (AD/DL) SAFETY EVALUATION REPORT - TAP II.E.1.1 - AUXILIARY FEEDWATER SYSTEM-DAVIS-BESSE	Transmits SER for NUREG-0737 Item II.E.1.1. SER concludes with implementation of recommendations identified the Davis-Besse AFW system reliability will be considerably and acceptably improved. Diverse drive for the AFW pumps is not included among the recommendations. The forwarding memo states a CRGR package was forwarded to DL for comment. If reviewed affirmatively will require upgrade to meet power diversity for AFW systems.
October 17, 1983 (internal)	Memo from A. Thadani (RRAB/DST) to O. Parr (ASB/DSI) AUXILIARY FEEDWATER SYSTEM CRGR PACKAGE	Presents estimates of radioactivity releases due to loss-of-main-feedwater transients, and other input data for use in CRGR package for AFW system. Submitted as a result of a meeting on September 16, 1983 re CRGR package.
October 25, 1983 (internal)	Memo from T. Speis (D/DST) to R. Mattson (D/DSI) COMMENTS ON DRAFT CRGR PACKAGE CONCERNING REQUIREMENTS FOR UPGRADING AUXILIARY FEEDWATER SYSTEMS IN OPERATING PLANTS	Comments on draft CRGR package as requested by August 22, 1983 memo. Notes that the package, if implemented independently, will have significant ramifications on USI A-45 program. Suggests a more detailed regulatory analysis should be done to provide a good basis for deciding whether this issue should be done independently of A-45 issue. Suggests deferral of the decision until then. Also comments that the statement that a 2-pump AFW system cannot demonstrate acceptable reliability is not supported by the reference. Questions if it is true that only a 3-pump system can satisfy the reliability criterion.

Date	Description	Remarks
November 16, 1983 (internal)	Memo L. Rubenstein (AD/DSI) to G. Lainas (AD/DL) re: AUXILIARY FEEDWATER RELIABILITY STUDY, DAVIS BESSE UNIT 1	Transmits memorandum A. Thadani to O. Parr dated February 4, 1983. No recommended action on Davis-Besse.
December 7, 1983 (internal)	Memo D. Eisenhut (D/DL) to R. Mattson (D/DSI) re: DRAFT CRGR PACKAGE CONCERNING REQUIREMENTS FOR UPGRADING AUXILIARY FEEDWATER SYSTEMS IN OPERATING PLANTS	Transmits comments on the CRGR package as requested by memorandum of August 22, 1983.
January 16, 1984 (internal)	Memo A. Thadani (RRAB/DST) to O. Parr (ASB;DSI) re: Additional Information for the Auxiliary Feedwater System CRGR Package	Revises estimates of probability of certain events in the CRGR package.
February 21, 1984 (external)	Letter from J. Stolz (ORB#4/DL) to Toledo Edison Transmits SER Addressing NUREG-0737 Item II.E.1.1	Transmits SER for NUREG-0737, Item II.E.1.1. Identifies unresolved items and indicates licensee can appeal imposition of the required Technical Specifications to DL.
April 9, 1984 (internal)	Memo from E. Jordan (IE) to D. Eisenhut (D/DL) DAVIS BESSE STUCK OPEN SAFETY VALVE EVENT OF MARCH 2, 1984	Refers to March 2, 1984 steam generator dry-out event at Davis-Besse and indicates OIE support and encouragement for the proposed CRGR effort to require diverse AFW pump power. Indicates additional equipment failures during the event could have led to serious safety consequences.
April 17, 1984 (internal)	Memo from L. Rubenstein (AD/DST) to G. Lainas (AD/DL) re: ADDITIONAL INPUT FOR THE UCS TMI-1 2.206 PETITION - COMPARISON OF B&W PLANTS EMERGENCY FEEDWATER SYSTEMS TO SRP SECTION 10.4.9 CRITERIA	Comparison of the EFWS at TMI-1 and other B&W operating plants. Notes Davis Besse AFW system has unavailability in low range compared to other operating plants.
April 1984 (external)	NUREG-1066, "Comparison of Implementaion of Selected TMI Action Plan Requirements on Operating Plants Designed by Babcock & Wilcox"	Provides results of a study of eight B&W designed nuclear power plants to determine the degree of compliance with selected NUREG-0737 requirements.

255

Date	Description	Remarks
April 23, 1984 (external)	Letter from J. Stolz (ORB#4/DL) to Toledo Edison re: AUXILIARY FEEDWATER SYSTEM RELIABILITY STUDY	Letter transmits SER and BNL evaluation of of Toledo Edison Co. AFW system reliability analysis December 31, 1981. Concludes Davis Besse AFW is in low reliability range and unavailability exceeds the numerical criterion in SRP. Toledo Edison Co. study differs substantially in scope and assumptions from NUREG-0611 prescribed values, therefore, meaningful comparison to licensees results can not be made.
June 20, 1984 (internal)	Memo from A. DeAgazio (ORB#4/DL) to G. Lainas (AD/DL) THIRD AFW PUMP/DIESEL GENERATOR AT DAVIS-BESSE	Presents brief chronology of NRC efforts to get a diverse power AFW pump at Davis-Besse. Notes that Toledo Edison AFW system reliability Study concluded cost benefit comparison favors "Analysis based" configuration and not the third train of AFW. Commits to improvements upon receipt of NRC concurrence with approach. States Toledo Edison has no plans for third train configuration.
July 18, 1984	Memo from L. Rubenstein (AD/DSI) to G. Lainas (AD/DL) AUXILIARY FEEDWATER SYSTEM - POWER DIVERSITY REQUIREMENTS AT DAVIS BESSE	Memorandum indicates that CRGR package is delayed, therefore, urges having discussions with Toledo Edison regarding the issue of diverse AFW pump drive without waiting for CRGR action.
September 19, 1984 (internal)	Meeting with Toledo Edison Company	This meeting between Toledo Edison Co. and NRC was to discuss modifications to the feedwater system at Davis Besse. Toledo commits to install new startup pump with larger capacity which will meet diversity requirements.

Date	Description	Remarks
September 28, 1984 (internal)	Memo H. Denton (NRR) to W. Dircks (EDO) re: CLOSEOUT OF TMI ACTION PLAN TASK II.E.5.2 TRANSIENT RESPONSE OF B&W DESIGNED REACTORS	Presents status of NUREG-0667. The Status Table indicated that ADB had determined that diverse drive was not necessary. However, this memo did not accurately reflect the staff position on diverse drive which is stated in the July 18, 1984 memo, identified above.
October 9, 1984 (internal)	Memo from A. DeAgazio (ORB#4/DL) to G. Lainas POTENTIAL BACKFIT ISSUE AT DAVIS BESSE	Identifies potential backfit issue at Davis Besse as a result of a meeting held on 9/19/84 with Toledo Edison. At that meeting Toledo Edison agreed to install an upgraded startup feedwater pump which will meet diversity requirements and resolve Appendix R and high/medium energy line break considerations. Concludes no backfit issue involved.
November 9, 1984 (internal)	Memo A. Thadani (RRAB/DST) to O. Parr (ASB/DSI) re: Auxiliary Feedwater System CRGR Package	Provides analysis of probability of four events discussed in CRGR package.
November 20, 1984 (internal)	Memo L. Rubenstein (AD/DSI) to G. Lainas (AD/DL) re: CONTINUED OPERATION OF STARTUP FEEDWATER PUMP - DAVIS BESSE 1	Transmits SER on continued use of existing startup feedwater pump. Concludes use with present pipe arrangement is acceptable until installation of the new startup feedwater pump system.
November 21, 1984 (external)	Letter from Toledo Edison to J. Stolz (ORB#4/DL) Presents Preliminary Design for Proposed Upgraded Startup Feedwater Pump	Presents general system description of the proposed upgraded startup feedwater pump. Licensee committed to installation of the new pump at the September 19, 1984 meeting.
January 8, 1985 (external)	Letter from A. DeAgazio (ORB#4/DL) to Toledo Edison AMENDMENT NO. 83 TO FACILITY OPERATING LICENSE NO. NPF-3: LICENSE CONDITION RELATING TO STARTUP FEEDWATER PUMP OPERATION	License Condition added to the Davis Besse operating license requires the installation of a new startup feedwater pump before starting Cycle 6 and improves operating restrictions with the present pump until then.

BEST COPY

Date	Description	Remarks
March 12, 1985 (internal)	Memo from O. Parr (ASB/DSI) to J. Stolz (ORB#4/DL) re: DAVIS BESSE STARTUP FEEDWATER PUMP - TAC NO. 55581	Submits comments and recommendations on Toledo Edison Co. proposed startup pump design presented in the November 21, 1984 letter from Toledo Edison Company. Generally, the proposed design should be acceptable for diversity considerations.
June 10, 1985 (external)	Letter J. Keppler (R:III, NRC) to Toledo Edison Co., re: CONFIRMATORY ACTION LETTER	Identifies the actions to be taken by the licensee prior to obtaining approval from Region III to resume operations.
June 17, 1985 (internal)	Meeting with Toledo Edison Co. TRANSCRIPT OF MEETING BETWEEN THE NRC STAFF AND TOLEDO EDISON CO. CONCERNING AFW SYSTEMS	Toledo Edison discussed the AFW system design and a chronology of actions taken to improve the AFW system reliability.

QUESTION 13: IN TERMS OF CONFIGURATION, RELIABILITY, DIVERSITY AND CAPACITY HOW, IF AT ALL, DOES THE AUXILIARY FEEDWATER SYSTEM AT DAVIS-BESSE DIFFER FROM THE SYSTEM IN PLACE ON MARCH 28, 1979?

ANSWER:

THE DAVIS-BESSE AFWS WAS ORIGINALLY DESIGNED AS A SAFETY GRADE SYSTEM. THERE HAS BEEN NO CHANGE IN THE DAVIS-BESSE AFWS IN TERMS OF CONFIGURATION (TWO PUMP TRAINS), POWER DIVERSITY FOR THE PUMPS, AND PUMP CAPACITIES SINCE MARCH 28, 1979. SINCE 1979, THE PLANT HAS MODIFIED THE VALVES IN ONE AFW PUMP TRAIN FROM AC POWERED TO DC POWERED IN ORDER TO PROVIDE INDEPENDENCE FROM AC POWER. SOME PUMP INTERLOCKS AND SPEED SWITCHES HAVE ALSO BEEN ELIMINATED. ADDITIONAL TECHNICAL SPECIFICATIONS HAVE BEEN PROPOSED (1) FOR VERIFICATION OF AFW FLOW FROM THE PRIMARY WATER SOURCE (CONDENSATE STORAGE TANK) TO THE STEAM GENERATORS AND (2) FOR PUMP TESTING TO PROVIDE COMMUNICATION BETWEEN THE OPERATOR IN THE CONTROL ROOM AND THE PERSONNEL PERFORMING THE TEST LOCALLY. AS PART OF THE TMI ACTION PLAN DAVIS-BESSE IMPROVED THE AUTOMATIC INITIATION OF THE AFW SYSTEM TO SAFETY GRADE. ADDITIONALLY UPGRADES WERE MADE IN FLOW INSTRUMENTATION AND OTHER INDICATORS ASSOCIATED WITH THE AFW SYSTEM. FURTHERMORE THE AFW TURBINE EXHAUST LINES HAVE BEEN UPGRADED TO MEET SEISMIC CATEGORY 1 REQUIREMENTS AND THE MECHANICAL-HYDRAULIC GOVERNOR ON ONE AFW PUMP HAS BEEN REPLACED WITH A HYDRAULIC GOVERNOR. LASTLY, ALL LOCAL MANUALLY-OPERATED VALVES, AND THE HANDWHEELS AND LOCAL PUSHBUTTON STATIONS OF THE MOTOR-OPERATED VALVES, IN BOTH AFW SUCTION AND DISCHARGE PARTS ARE NOW LOCKED IN THE OPEN POSITION. THESE CHANGES ARE CONSIDERED TO BE AN IMPROVEMENT TO THE OVERALL RELIABILITY OF THE AFWS WHEN COMPARED TO THE SYSTEM IN PLACE BEFORE 1979.

QUESTION 14. ACCORDING TO PRELIMINARY INFORMATION PROVIDED BY THE NRC STAFF, THE LICENSEE HAS RESISTED NRC RECOMMENDATIONS TO IMPROVE THE RELIABILITY AND CAPACITY OF THE AUXILIARY FEEDWATER SYSTEM AT DAVIS-BESSE. IS THIS TRUE AND IF SO, WHY DID NRC NOT REQUIRE THAT IMPROVEMENTS BE MADE?

ANSWER.

THE LICENSEE WAS NOT IN AGREEMENT WITH THE NRC RECOMMENDATIONS THAT IMPROVEMENTS TO THE AFW RELIABILITY MUST BE ACHIEVED BY THE ADDITION OF A THIRD AFW PUMP. THE LICENSEE'S STUDIES WERE CONDUCTED TO REVIEW ALTERNATIVE, MORE COST-EFFECTIVE WAYS OF IMPROVING RELIABILITY OF THE AFW SYSTEM.

AS INDICATED IN A RESPONSE TO QUESTION 12, THERE HAVE BEEN ONGOING DISCUSSIONS SINCE 1979 RELATED TO IMPROVING THE RELIABILITY OF THE AFW SYSTEM AND REDUCING ITS DEPENDENCY UPON MOTIVE POWER FROM STEAM ONLY. STARTING WITH THE ISSUANCE OF THE ORIGINAL OPERATING LICENSE AT DAVIS-BESSE, THROUGH THE ISSUANCE OF THE MAY 16, 1979 ORDERS AND SUBSEQUENT ACTIONS, THROUGH THE ISSUANCE OF NUREG 0737 REQUIREMENTS, AND THROUGH THE ONGOING DISCUSSIONS RELATED TO THE DIVERSE POWER ISSUE, WHICH INCLUDED

SEVERAL RELIABILITY ANALYSES TO IDENTIFY DOMINANT FAILURE CONTRIBUTORS, BOTH THE NRC AND THE LICENSEE HAVE IDENTIFIED SYSTEM MODIFICATIONS, AND PROCEDURAL CHANGES WHICH WOULD IMPROVE THE RELIABILITY OF THE AFW SYSTEM. ALL OF THE MODIFICATIONS REQUIRED BY THE NRC AND MANY OF THOSE IDENTIFIED BY THE LICENSEE HAVE BEEN IMPLEMENTED. AS INDICATED IN THE RESPONSE TO QUESTION 12, A NEW STARTUP FEEDWATER PUMP IS TO BE INSTALLED, BY LICENSE CONDITION, PRIOR TO RESTART FROM THE NEXT REFUELING OUTAGE.

WE WILL REVIEW THE FINAL DESIGN OF THE NEW STARTUP FEEDWATER PUMP TO DETERMINE WHETHER THE RELIABILITY OR DIVERSITY ISSUES HAVE BEEN RESOLVED.

REGARDING THE "CAPACITY" ISSUE, THE MAY 16, 1979 COMMISSION ORDER TO TOLEDO EDISON COMPANY REQUIRED AMONG OTHER ACTIONS, THAT "THE LICENSEES WILL REVIEW AND VERIFY THE ADEQUACY OF THE AUXILIARY FEEDWATER SYSTEM CAPACITY". THE LICENSEE PROVIDED INFORMATION WHICH SHOWED THAT THE TOTAL MINIMUM FLOW TO ONE OR BOTH STEAM GENERATORS OF 550 GPM IS REQUIRED TO SUPPORT ACCIDENT ANALYSES. THE LICENSEE ALSO SUPPLIED DATA WHICH SHOWED THAT EVEN THE DESIGN FLOW OF 800 GPM TO EACH STEAM GENERATOR FROM THE

RESPECTIVE AFW PUMPS IS EXCEEDED (GREATER THAN 850 GPM). THE FLOW CAPACITY OF THE DAVIS-BESSE AFW SYSTEM IS NOT AND HAS NEVER BEEN AN ISSUE.

QUESTION 15. THE COMMISSION WAS PROVIDED WITH A PRELIMINARY SEQUENCE OF EVENTS WHICH OCCURRED AT DAVIS-BESSE IN A JUNE 12, 1985 MEMORANDUM FROM WILLIAM J. DIRCKS, EXECUTIVE DIRECTOR FOR OPERATIONS THAT APPEARS NOT TO INCLUDE SEVERAL IMPORTANT DETAILS OF THE INCIDENT. FOR EXAMPLE, THE PRELIMINARY CHRONOLOGY FAILS TO NOTE THAT THE PORV STUCK OPEN, THAT ECCS WAS INITIATED AND TURNED OFF, AND THAT ONE OF THE AUXILIARY FEEDWATER PUMPS COULD NOT BE RETURNED TO OPERATION FROM THE CONTROL ROOM. WHEN DID THE COMMISSION FIRST BECOME AWARE OF THIS INFORMATION, AND WHY WAS IT NOT TRANSMITTED TO THE COMMISSION IN THE JUNE 12, 1985 MEMORANDUM?

ANSWER:

THE PRELIMINARY CHRONOLOGY WHICH WAS PROVIDED TO THE COMMISSION IN THE JUNE 12, 1985 MEMORANDUM, CONTAINED IN PART A PRELIMINARY SEQUENCE OF EVENTS PREPARED ON JUNE 10, 1985 BY THE LICENSEE, TOLEDO EDISON COMPANY. AS SUCH IT WAS STILL UNDERGOING EXTENSIVE REVIEW AND EVALUATION BY BOTH THE UTILITY AND NRC.

In regard to the missing information, on June 9, 1985, the Staff had been briefed on the ECCS manual initiation as well as on other important plant parameters related to the incident. On June 11, 1985, Preliminary Notification PNO-III-85-47A was issued providing information regarding the faulty operation of the PORV and the subsequent operator action of closing the block valve. This information was determined from a review of an alarm printer by NRC site inspectors and management onsite on June 10, 1985. The staff was also aware on June 9, 1985 that one auxiliary feed pump was being controlled locally outside the control room. The staff had also confirmed that both pumps supplied auxiliary feedwater to the steam generators following auxiliary feedwater system restoration. The NRC site teams (Region III and Fact Finding Teams) were briefed, by the licensee, on the specifics of how the auxiliary feedwater controls were used on June 11, 1985. The Daily Report on June 12, 1985 indicated the nature of these activities. Please see the answer to Question 16 regarding the preliminary sequence of events.

QUESTION 16. ACCORDING TO A JUNE 13, 1985 MEMORANDUM FROM WILLIAM J. DIRCKS, EXECUTIVE DIRECTOR FOR OPERATIONS, TO THE COMMISSION, THE LICENSEE FAILED TO PROVIDE ACCURATE INFORMATION TO THE NRC ABOUT THE DAVIS-BESSE INCIDENT. THE MEMORANDUM STATES: "IT BECAME CLEAR THAT THE INITIAL WRITTEN DESCRIPTION OF THE EVENT WAS INCOMPLETE AND THAT A NUMBER OF POTENTIALLY IMPORTANT DETAILS WERE NOT INCLUDED." WHAT INFORMATION WAS INCOMPLETE AND WHAT DETAILS WERE NOT INCLUDED IN THE LICENSEE'S INITIAL REPORT TO NRC? WHAT IS THE REASON FOR THIS FAILURE AND WHAT, IF ANY, REPORTING REQUIREMENTS WERE VIOLATED?

ANSWER.

THE MEMORANDUM REFERRED TO IN THIS QUESTION NOTED THAT THE LICENSEE GAVE A BRIEFING ON THE EVENT SEQUENCE AND THAT IT BECAME CLEAR THAT THE INITIAL WRITTEN DESCRIPTION OF THE EVENT WAS INCOMPLETE, AND THAT A NUMBER OF POTENTIALLY IMPORTANT DETAILS WERE NOT INCLUDED. THIS INCOMPLETENESS

WAS NOTED BY THE TEAM BECAUSE THE LICENSEE'S ORAL BRIEFING THAT OCCURRED WHEN THE TEAM ARRIVED GAVE DETAILS ON ITEMS THAT WERE NOT INCLUDED IN THE INITIAL LICENSEE PREPARED SEQUENCE. THE INITIAL TELEPHONE REPORT ON THE EVENT ON JUNE 9, 1985 ALSO DID NOT INCLUDE A NUMBER OF DETAILS NOW KNOWN TO THE NRC. AS AN EVENT EVALUATION PROCEEDS, THE EXTENT OF KNOWLEDGE ABOUT THE EVENT INCREASES, AND THE SEQUENCE OF EVENTS IS EXPANDED AND REVISED IN ORDER TO MAKE IT MORE DETAILED. IT IS THE TEAM'S UNDERSTANDING THAT THE LICENSEE'S INITIAL SEQUENCE OF EVENTS WAS PREPARED QUICKLY AND PRIOR TO ITS COMPLETION OF THE ANALYSIS OF THE EVENT. THUS, THE OBSERVATION OF THE TEAM WAS THAT THE LICENSEE'S SEQUENCE OF EVENTS SHOULD BE EXPANDED. THE FACT-FINDING IS CONTINUING AND, AS A RESULT, IT IS EXPECTED THAT BOTH THE LICENSEE'S SEQUENCE OF EVENTS AND THE ONE DEVELOPED BY THE NRC'S FACT-FINDING TEAM WILL CONTINUE TO BE FURTHER REVISED AND EXPANDED, AS APPROPRIATE, ON THE BASIS OF NEW INFORMATION. SINCE THIS IS AN ONGOING PROCESS, REVISIONS OF THE INITIAL SEQUENCE MAY CONTINUE TO BE IDENTIFIED. FURTHER, THE LICENSEE HAS 30 DAYS FROM THE EVENT TO SUBMIT A WRITTEN REPORT CONCERNING THE EVENT (LER AS REQUIRED BY 10 CFR 50.73).

QUESTION 17. WHAT ACTIONS WILL NRC REQUIRE PRIOR TO RESTART OF DAVIS-BESSE. SPECIFICALLY, WILL NRC REQUIRE THAT THE JANUARY 1985 LICENSE CONDITION COMMITTING TO AN ADDITIONAL AUXILIARY FEEDWATER PUMP BE FULFILLED PRIOR TO RESTART. IN NOT, PLEASE EXPLAIN WHY.

ANSWER.

PRIOR TO THE RESTART OF DAVIS-BESSE-1 THE NRC WILL REQUIRE THE LICENSEE TO UNDERSTAND THE UNDERLYING CAUSES OF THE EVENT, TAKE APPROPRIATE CORRECTIVE ACTIONS, SPECIFICALLY CORRECT THE FAILURES THAT OCCURRED DURING THE JUNE 9, 1985 EVENT, AND PROVIDE A WRITTEN REPORT TO THE NRC. IN ADDITION, THE STAFF WILL MAKE A FINDING THAT THERE IS REASONABLE ASSURANCE THE AFW SYSTEM CAN REMOVE DECAY HEAT FROM THE DAVIS BESSE PLANT. THIS FINDING WILL BE BASED ON THE EFFECTIVENESS OF THE CORRECTIVE ACTIONS AND OTHER IMPROVEMENTS MADE TO THE EXISTING AFW SYSTEM IN RESTORING IT TO THE SAME QUALITY STANDARDS ASSUMED IN THE ORIGINAL LICENSING DECISION.

A DECISION REGARDING INSTALLING THE ADDITIONAL AUXILIARY FEEDWATER PUMP PRIOR TO RESTART HAS NOT BEEN MADE. THIS DECISION IS DEPENDENT ON THE STAFF'S EVALUATION OF THE EVENT AND THE LICENSEE'S CORRECTIVE ACTIONS.

THE FACT-FINDING TEAM AT THE DAVIS-BESSE SITE WILL DEVELOP ADDITIONAL INFORMATION REGARDING THE EVENT AND AREAS NEEDING IMPROVEMENTS. THE TEAM'S FINDINGS WILL BE CONSIDERED PRIOR TO A RESTART DECISION.

A CONFIRMATORY ACTION LETTER WAS ISSUED JUNE 10, 1985 BY OUR REGIONAL ADMINISTRATOR, MR. KEPPLER. THIS ACTION INSURES THE PLANT WILL REMAIN SHUTDOWN UNTIL THE NRC IS ASSURED THAT APPROPRIATE CORRECTIVE ACTIONS HAVE BEEN TAKEN. A COPY OF OUR CONFIRMATORY ACTION LETTER IS ATTACHED TO THE QUESTION 23 RESPONSE.

QUESTION 18. LIST ALL PENDING REQUIREMENTS AND LICENSING ACTIONS RELATING TO SYSTEMS AND COMPONENTS INVOLVED IN THE DAVIS-BESSE EVENT.

ANSWER.

THE FOLLOWING IS A LIST OF LICENSING ACTIONS OR REQUIREMENTS PENDING THAT ARE RELATED TO SYSTEMS OR COMPONENTS INVOLVED IN THE EVENT:

A. RELIEF VALVE/SAFETY VALVE TESTING, NUREG 0737 ITEM II.D.1. THERE WERE NO MODIFICATIONS NECESSARY ON THE PORV AS A RESULT OF THE EPRI TEST PROGRAM. MODIFICATION TO THE SAFETY VALVE (RELOCATION AND LOOP-SEAL) WERE COMPLETED IN 1982. REGARDING THE POST-IMPLEMENTATION REVIEW, THE LICENSEE HAS SUBMITTED THE REQUIRED TESTING REPORTS. A REQUEST FOR ADDITIONAL INFORMATION HAS BEEN SENT TO THE LICENSEE. RESPONSES ARE DUE IN MID-JULY 1985.

B. LICENSE CONDITION 2.C.3(T) TO OPERATING LICENSE, NPF-3. THE LICENSEE IS REQUIRED TO INSTALL A NEW, START-UP FEEDWATER PUMP BEFORE STARTUP FROM THE NEXT REFUELING OUTAGE.

QUESTION 18. (CONTINUED) - 2 -

C. AFW SYSTEM TECHNICAL SPECIFICATIONS

THE LICENSEE HAS SUBMITTED PROPOSED TECHNICAL SPECIFICATIONS AS REQUIRED UNDER NUREG-0737 ITEM II.E.1.1. THESE HAVE BEEN REVIEWED AND CERTAIN CHANGES (INVOLVING THE FLOW VERIFICATION TEST AND THE TEST AND OPERATING PROCEDURES) HAVE BEEN REQUESTED BY THE STAFF. THE LICENSEE WILL PROVIDE A REVISED PROPOSAL BY THE END OF JULY 1985.

D. REPORT CHALLENGES TO PORV AND SAFETY VALVES

NUREG 0737 ITEM II.K.3.3 REQUIRES TECHNICAL SPECIFICATIONS TO REQUIRE REPORTING OF CHALLENGES TO PORV AND SAFETY VALVES. THE LICENSEE HAS SUBMITTED THE REQUESTED TECHNICAL SPECIFICATION. ISSUANCE OF THE AMENDMENT BY THE NRC IS IMMINENT.

E. DETAILED CONTROL ROOM DESIGN REVIEW SUMMARY REPORT

SUPPLEMENT 1 TO NUREG 0737 REQUIRED A DETAILED CONTROL ROOM DESIGN REVIEW (DCRDR) SUMMARY REPORT TO BE SUBMITTED.

THE SUMMARY REPORT HAS BEEN SUBMITTED BY THE LICENSEE AND IS CURRENTLY UNDER REVIEW BY THE NRC STAFF. (ALSO SEE ANSWER TO QUESTION 11).

F. DELETION OF AFW TURBINE SYSTEM VALVE INTERLOCK

THE LICENSEE HAS DETERMINE THAT DELETION OF STEAM PRESSURE INTERLOCKS ON THE AFW TURBINE VALVES WILL, AMONG OTHER THINGS, IMPROVE AFW RELIABILITY AND HAS REQUESTED TECHNICAL SPECIFICATION CHANGES THAT WILL PERMIT THE DELETION AND WHICH ARE CURRENTLY UNDER REVIEW BY NRC STAFF.

QUESTION 19. ACCORDING TO A JUNE 13, 1985 MEMORANDUM FROM WILLIAM J. DIRCKS, EXECUTIVE DIRECTOR FOR OPERATIONS, TO THE COMMISSION, THE NRC TASK FORCE INVESTIGATING THE INCIDENT HAS ALLOWED A LAWYER REPRESENTING THE LICENSEE TO BE PRESENT DURING INTERVIEWS WITH WORKERS AT THE PLANT. THIS PRACTICE WAS USED DURING THE INVESTIGATION OF THE ACCIDENT AT THREE MILE ISLAND WHERE SOME BELIEVE IT RESULTED IN LESS THAN CANDID TESTIMONY FROM WORKERS AND ENABLED THE COMPANY TO COORDINATE TESTIMONY. PRACTICES SUCH AS THIS WERE ALSO HARSHLY CRITICIZED BY THE DEPARTMENT OF JUSTICE IN A MARCH 25, 1983 LETTER. WHY IS THIS PRACTICE BEING ALLOWED AT DAVIS-BESSE WHEN THE NRC HAS ALREADY NOTED THAT INFORMATION ORIGINALLY PROVIDED WAS LESS THAN COMPLETE? WHAT, IF ANY POLICY DOES NRC HAVE ON THIRD PARTY ATTENDANCE DURING INVESTIGATIONS?

ANSWER.

BY WAY OF BACKGROUND IN ANSWERING THIS QUESTION, IT SHOULD BE NOTED THAT THE NRC DOES NOT HAVE THE AUTHORITY TO EXCLUDE AN ATTORNEY OR OTHER REPRESENTATIVE OF A PERSON'S CHOOSING FROM AN INTERVIEW. THE NRC CAN, OF COURSE, DECLINE TO CONDUCT AN INTERVIEW IF IT PERCEIVES THAT THE PRESENCE OF A THIRD PARTY MAY CREATE A CONFLICT OF INTEREST OR POTENTIAL INTERFERENCE WITH THE INVESTIGATION, BUT ONLY A COURT CAN EXCLUDE THE

QUESTION 19. (CONTINUED)

REPRESENTATIVE. THIS IS CONSISTENT WITH THE VIEW PROVIDED BY THE DEPARTMENT OF JUSTICE IN A FEBRUARY 16, 1984 LETTER FROM THE ASSISTANT ATTORNEY GENERAL FOR THE CRIMINAL DIVISION TO CHAIRMAN PALLADINO.

AS AN ALTERNATIVE TO A VOLUNTARY INTERVIEW OR IF A PERSON DOES NOT DESIRE TO COOPERATE WITH THE NRC, THE NRC MAY COMPEL A PERSON'S PRESENCE TO PROVIDE INFORMATION BY ISSUING A SUBPOENA IN ACCORDANCE WITH SECTION 161(c) OF THE ATOMIC ENERGY ACT OF 1954, AS AMENDED. HOWEVER, A PERSON SUBJECT TO A SUBPOENA IS ENTITLED TO BE ACCOMPANIED, REPRESENTED, AND ADVISED BY COUNSEL OR, IF PERMITTED BY THE AGENCY, BY OTHER QUALIFIED REPRESENTATIVE UNDER THE ADMINISTRATIVE PROCEDURE ACT, 5 USC 555(B). NRC MAY REQUEST THE ATTORNEY GENERAL OF THE UNITED STATES TO MAKE APPLICATION BEFORE THE DISTRICT COURT TO ENFORCE A SUBPOENA IN ACCORDANCE WITH SECTION 233 OF THE ATOMIC ENERGY ACT. AT THAT TIME, THE NRC COULD SEEK THE EXCLUSION OF THE PERSON'S REPRESENTATIVE. THE BASIS FOR THE REQUEST WOULD BE A CONFLICT OF INTEREST OR INTERFERENCE WITH THE INVESTIGATION. THE COURTS VARY AS TO THE DEGREE OF EVIDENCE NEEDED BY THE GOVERNMENT TO SUCCESSFULLY SUPPORT ITS REQUEST, BUT CLEARLY SOMETHING MORE THAN A HYPOTHETICAL CONCERN WOULD BE NEEDED.

THE NRC FACT FINDING TEAM FOLLOWED A PRACTICE OF PERMITTING INDIVIDUALS WHO WERE INTERVIEWED TO BE ACCOMPANIED AT THE INTERVIEW BY COUNSEL OR OTHER REPRESENTATIVES OF THEIR CHOOSING. THE TEAM DID NOT ENCOURAGE INDIVIDUALS TO BRING OTHER PERSONS WITH THEM TO THE INTERVIEW. IF AN INDIVIDUAL DID BRING REPRESENTATIVES WITH HIM, THE TEAM BELIEVED THAT THE INDIVIDUAL WANTED THE REPRESENTATIVES' ATTENDANCE AT THE INTERVIEW.

QUESTION 19. (CONTINUED)

THE TEAM FOLLOWED THIS APPROACH AT DAVIS-BESSE BASED ON A NUMBER OF FACTORS:

(1) THE STAFF DESIRED TO MINIMIZE THE ADVERSARY ENVIRONMENT INHERENT IN AN NRC INVESTIGATION. THIS WAS CONSISTENT WITH THE PRACTICE OF THE NATIONAL SAFETY TRANSPORTATION BOARD WHICH WE UNDERSTAND DOES NOT PLACE LIMITATIONS ON WHO ACCOMPANIES AN INTERVIEWEE.

(2) THE STAFF NEEDED TO PROMPTLY PRESERVE RELATIVELY FRESH RECOLLECTIONS OF INDIVIDUALS' ACTIONS IN THE PLANT DURING THE INCIDENT. AN ATTEMPT TO EXCLUDE THROUGH PERSUASION AN INTERVIEWEE'S REPRESENTATIVE MAY HAVE RESULTED IN THE INTERVIEWEE'S REFUSAL TO SPEAK TO THE TEAM VOLUNTARILY; THIS WOULD HAVE NECESSITATED THE RESORT TO COMPULSORY PROCESS WITH THE ACCOMPANYING DELAY IN GETTING INFORMATION.

(3) SUBPOENAS HAD NOT BEEN ISSUED TO THE INDIVIDUALS INTERVIEWED SUCH THAT THEY WERE NOT UNDER ANY COMPULSION TO SPEAK WITH NRC.

(4) THERE WAS NO APPARENT CONFLICT OF INTEREST. THE TEAM'S VIEW OF THE SITUATION AS ITS INQUIRY DEVELOPED WAS THAT THERE WAS NOT A SIGNIFICANT DIVERSITY OF INTEREST BETWEEN THE LICENSEE AND THOSE INTERVIEWED AS IT RELATES TO THIS INCIDENT; AND

(5) AS THE INTERVIEWS PROGRESSED, THE PRESENCE OF OTHER PERSONS AT THE INTERVIEWS DID NOT INTERFERE WITH THE INTERVIEWS AND DID NOT APPEAR TO HAVE RESULTED IN UNCANDID OR FABRICATED TESTIMONY FROM

QUESTION 19. (CONTINUED)

THE INDIVIDUALS. THE INFORMATION DESCRIBED IN THE JUNE 13TH MEMORANDUM AS "INCOMPLETE" REFERRED TO THE PRELIMINARY SEQUENCE OF EVENTS DEVELOPED BY THE LICENSEE AFTER THE TRANSIENT. IT WAS PROVIDED TO THE NRC TEAM WITH THE UNDERSTANDING THAT THE INFORMATION WAS PRELIMINARY AND SUBJECT TO REVISION. AS STATED IN THE JUNE 13TH MEMORANDUM, THE LICENSEE WAS CONSIDERED TO BE CANDID, FORTHCOMING AND COOPERATIVE WITH THE TEAM. ITS ACTIONS WERE NOT VIEWED AS AN ATTEMPT TO WITHHOLD OR CONCEAL INFORMATION FROM THE TEAM.

COMPANY COUNSEL WAS NOT, IN FACT, IN ATTENDANCE AT ALL OF THE INTERVIEWS. FOR EXAMPLE, THE SHIFT SUPERVISOR ON DUTY ON THE NIGHT OF THE INCIDENT INITIALLY SPOKE TO THE TEAM ALONE; TWO REACTOR OPERATORS WHO WERE ON DUTY ASKED FOR THE PRESENCE OF THEIR OPERATIONS SUPERVISOR DURING THEIR INTERVIEWS.

IN ANSWER TO THE PORTION OF THE QUESTION CONCERNING EXISTING COMMISSION GUIDANCE ON THIRD PARTY ATTENDANCE AT INTERVIEWS, THE COMMISSION APPROVED ON MAY 21, 1985, THE FOLLOWING POLICY APPLICABLE TO INVESTIGATIONS INVOLVING POTENTIAL WRONGDOING BY THE COMMISSION'S OFFICE OF INVESTIGATIONS:

> INDIVIDUALS BEING INTERVIEWED WILL NORMALLY BE PERMITTED TO HAVE A PERSONAL ATTORNEY OR OTHER PERSONAL REPRESENTATIVE PRESENT DURING INTERVIEWS. HOWEVER, IF THE PERSONAL ATTORNEY OR REPRESENTATIVE ALSO REPRESENTS ANOTHER POTENTIAL INTERVIEWEE, OR THE COMPANY BEING INVESTIGATED, THEN THE INVESTIGATOR WILL CONTACT HEADQUARTERS AND A CASE-BY-CASE DETERMINATION SHALL BE MADE WHETHER TO EXCLUDE THE PERSONAL ATTORNEY ON CONFLICT OF INTEREST GROUNDS. REQUESTS FOR OTHER THAN PERSONAL COUNSEL SHALL BE HANDLED ON A CASE-BY-CASE BASIS AFTER CONSULTATION WITH OGC.

QUESTION 19. (CONTINUED)

THE COMMISSION HAS NOT ADOPTED A POLICY ON THIRD PARTY ATTENDANCE FOR STAFF INVESTIGATIONS SUCH AS THE TEAM INVESTIGATION AT DAVIS-BESSE. THIS ISSUE WILL BE CONSIDERED IN DEVELOPING THE INCIDENT INVESTIGATION TEAM PROGRAM.

QUESTION 20. Please provide the following information for each year since 1980:

(a) The number of 10 CFR 50.72 reports.

ANSWER.

Year	Number of 10 CFR 50.72 Reports From Davis-Besse
1980	12
1981	14
1982	7
1983	18
1984	14
1985 (to June 19)	11

QUESTION 20. (B) The total number of Licensee Event Reports, specifying the number attributable to personnel error, equipment failures, and design or fabrication errors.

ANSWER.

Summary of LERs from Davis Besse for 1981-1984

		Cause Stated in LER Abstract			
Year	No. of LERs	Personnel	Equipment	Design/ Fabrication	Other
1981	79	33	37	8	1
1982	68	28	23	13	4
1983	74	19	38	10	7
1984	22	8	7	6	1
TOTALS	243	88	105	37	13

QUESTION 20. (c) The number of unusual events, alerts and abnormal occurrences.

ANSWER.

The fifteen (15) Davis-Besse Unusual Events are as follows:

Date	Description
04/13/80	Flood Watch
06/25/80	Minor Fire in Control Room
07/29/80	Eye Injury Non-Nuclear Related
02/04/81	Loss of Meteorological Indication
02/19/81	Loss of Meteorological Indication
12/16/82	Overturned Gasoline Truck in Area
01/18/83	Loss of Containment Integrity (No. 2 MSIV Leaking)
12/17/83	Reactor Coolant Leak (Letdown System Isolation Valve Packing Leak)
01/17/84	Loss of Meteorological Indication
02/21/84	Loss of Meteorological Indication
03/02/84	Main Steam Line Safety Valve Stuck Open
05/02/84	Loss of Meteorological Indication
05/06/85	Loss of Meteorological Indication
05/16/85	RCS Leak/Pressurizer Spray Valve Packing
06/09/85	Reactor Trip/Loss of Main Feedwater/Auxiliary Feedwater Malfunction

QUESTION 20c. (CONTINUED) - 2 -

THE DAVIS-BESSE ALERTS ARE AS FOLLOWS:

NONE.

THE DAVIS-BESSE ABNORMAL OCCURRENCES ARE AS FOLLOWS:

1981 - NO REPORTS.

1982 - IN NUREG-0090, VOL. 5, NO. 2, INFORMATION WAS REPORTED ON DAMAGE THAT OCCURRED TO THE STEAM GENERATOR AUXILIARY FEEDWATER HEADER IN NO. 1 AND NO. 2 STEAM GENERATORS. THIS INFORMATION APPEARED IN THE UPDATE SECTION OF THE REPORT UNDER ABNORMAL OCCURRENCE 76-11, STEAM GENERATOR PROBLEMS.

1983 - NO REPORTS.

1984 - NO REPORTS.

QUESTION 20. (D) THE NUMBER AND CAUSE OF REACTOR TRIPS.

ANSWER.

OVER THIS PERIOD OF FIVE AND ONE-HALF YEARS, FORTY (40) REACTOR TRIPS OCCURRED. THE CAUSE OF EACH TRIP AND ITS DATE ARE SHOWN IN THE FOLLOWING TABLE. A LIST OF CAUSE DEFINITIONS IS PROVIDED AT THE END OF THIS TABLE. FOR 1984 AND 1985, REACTOR TRIPS WERE ANALYZED TO DETERMINE IF AUXILIARY FEEDWATER PROBLEMS OCCURRED AFTER THE TRIP; THOSE ARE MARKED WITH AN ASTERISK, "*". THIS ANALYSIS WAS NOT DONE FOR OTHER YEARS.

DATE	CAUSE	
02/05/80	HARDWARE	BELIEVED CAUSED BY MAIN STEAM ISOLATION VALVE CLOSURE.
03/27/80	HARDWARE	ELECTRICAL FAILURE IN THE ROD CONTROL SYSTEM.
04/07/80	HARDWARE & HUMAN ERROR	HIGH FLUX DURING MAINTENANCE ON FEEDWATER HEATER CAUSED PRESSURE INCREASE IN CONDENSER AND THE AUTOMATIC INTEGRATED CONTROL SYSTEM (ICS) ATTEMPTED TO CORRECT.

QUESTION 20D. (CONTINUED) - 2 -

DATE	CAUSE	
11/06/80	NOT PROVIDED	BELIEVED TO BE DUE TO ELECTRICAL PROBLEM IN SWITCH YARD.
11/07/80	HUMAN ERROR	PERSONNEL ERROR COMPLICATED BY ICS CONTROL.
11/12/80	HARDWARE	ELECTRICAL FAILURE.
03/11/81	HUMAN ERROR	ELECTRICIAN ERROR LED TO MAIN STEAM ISOLATION VALVE CLOSURE.
04/25/81	HUMAN ERROR	DURING STARTUP, TRIPPED ON LOW STEAM GENERATOR LEVEL DURING TEST OF MAIN FEEDWATER BLOCK VALVE. STARTUP FEED PUMP DID NOT RESPOND QUICKLY ENOUGH.
05/12/81	HARDWARE	ELECTRICAL FAILURE.
06/24/81	HARDWARE	LOSS OF DC RESULTED IN LOSS OF NON-NUCLEAR INSTRUMENTATION.

DATE	CAUSE	
07/30/81	NOT PROVIDED	
09/02/81	NOT PROVIDED	MANUAL TRIP.
10/22/81	PROCEDURE	TRIP DURING USE OF SURVEILLANCE TEST PROCEDURE.
12/28/81	NOT PROVIDED	HIGH FLUX TRIP (POSSIBLY SPURIOUS) WHILE EXERCISING RODS.
10/28/82	PROCEDURE	CONTROL VALVE TESTING.
10/29/82	NOT PROVIDED	MAIN FEED PUMP TRIP DURING SURVEILLANCE TESTING.
11/08/82	HARDWARE	FAULTY MOISTURE SEPARATOR-REHEATER LEVEL SWITCH.
01/15/83	HUMAN ERROR	UNTIMELY CORRECTION OF AXIAL FLUX IMBALANCE.

QUESTION 20D. (CONTINUED)

DATE	CAUSE	
01/18/83	HARDWARE	ELECTRICAL FAILURE, BLOWN NON-NUCLEAR INSTRUMENTATION FUSE CAUSED HIGH PRESSURE TRIP.
01/31/83	HUMAN ERROR	DUE TO FEEDWATER FLOW REGULATING VALVE BEING CYCLED.
04/10/83	HUMAN ERROR	NEGATIVE AXIAL FLUX IMBALANCE.
05/10/83	HARDWARE	ELECTRICAL FAILURE OF AN INVERTER.
07/25/83	NOT PROVIDED	ACTUATION OF STEAM AND FEEDWATER RUPTURE CONTROL SYSTEM FOR UNKNOWN REASON.
10/02/83	S/G LEVEL	TRIP DUE TO MANUAL FEEDWATER CONTROL.
10/02/83	HARDWARE	ELECTRICAL FAILURE IN INTEGRATED CONTROL SYSTEM (ICS).
10/03/83	HUMAN ERROR	ICS IN COMBINATION WITH HUMAN ERROR.

QUESTION 20D. (CONTINUED)

DATE	CAUSE	
10/15/83	HARDWARE	CONTROL PROBLEM WITH MAIN FEED PUMP.
11/09/83	HARDWARE	ELECTRICAL FAILURE IN CONTROL ROD DRIVE SYSTEM.
11/14/83	HARDWARE	ELECTRICAL FAILURE IN CONTROL ROD DRIVE MODULE.
12/17/83	HARDWARE	ELECTRICAL FAILURE IN REACTOR PROTECTION SYSTEM ANTICIPATORY TRIP CHANNEL.
01/09/84	HARDWARE	ELECTRICAL FAILURE IN THE CONTROL ROD DRIVE SYSTEM.
03/02/84*	HARDWARE	MAIN STEAM ISOLATION VALVE CLOSURE.
06/24/84	HUMAN ERROR	OPENED WRONG TRIP BREAKER DURING SURVEILLANCE TESTING.

QUESTION 20D. (CONTINUED) - 6 -

DATE	CAUSE	
09/11/84	HUMAN ERROR	FEEDWATER MOISTURE SEPARATOR-REHEATER LEVEL SWITCH BUMPED.
09/12/84	HARDWARE	STEAM AND FEEDWATER CONTROL SYSTEM ELECTRICAL FAILURE.
01/15/85*	S/G LEVEL	FEEDWATER FLOW CONTROL VALVES WERE IN MANUAL AT ZERO POWER.
03/21/85	HARDWARE	OSCILLATIONS IN FEEDWATER CAUSED BY MAIN FEED PUMP.
04/24/85	HARDWARE	FLUX TO FLOW IMBALANCE SIGNAL.
06/02/85	HARDWARE	TURBINE TRIP ON HIGH VIBRATION DURING TESTING.
06/09/85*	HARDWARE	LOSS OF MAIN FEED PUMP.

Summary. The overall trip summary by cause for those reactor trip since 1980 is as follows.

Hardware	20
Human Error	9
Steam Generator	2
Procedure	2
Hardware and Human Error	1
Other	6
TOTAL	40

CAUSE DEFINITIONS

HARDWARE	The scram was a direct result of a system, subsystem, major system component, or component failure or fault.
HUMAN ERROR	The scram was the direct result of an incorrect personnel action.
BOTH (HARDWARE & HUMAN ERROR)	Any combination of hardware and human error that cause a reactor scram. Note that the only requirement is that the scram would not have occurred without both actions.
PROCEDURE	Reactor scrams that are a direct result of procedural deficiencies.
S/G LEVEL	Reactor scrams that occur while the steam generator Level Control System is in manual control.
UNKNOWN	Reactor scrams for which no cause can be defined, i.e., when the system initiating the scram is tested after the plant has been stabilized no failure or fault can be found.

CAUSE DEFINITIONS

NOT PROVIDED	THE SCRAM CAUSE COULD NOT BE DETERMINED BASED ON INFORMATION PROVIDED IN THE LICENSEE'S LER.

QUESTION 20. (E) THE NUMBER OF ALL ENFORCEMENT ACTIONS INCLUDING A BRIEF DESCRIPTION OF THE ISSUE, THE SEVERITY CLASSIFICATION AND ANY FINE LEVIED.

ANSWER.

TWO ESCALATED ENFORCEMENT ACTIONS HAVE BEEN TAKEN AND COPIES OF THE ACTIONS ARE ATTACHED. A COMPUTER PRINTOUT OF ALL CITATIONS, INCLUDING NON-ESCALATED ACTIONS, HAS BEEN PROVIDED IN ENCLOSURE 2 AS WELL AS A COPY OF TWO NOTICES OF VIOLATIONS AND PROPOSED IMPOSITION OF CIVIL PENALTIES.

A. A NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTIES IN THE AMOUNT OF $90,000 WAS ISSUED ON NOVEMBER 21, 1984 AND INVOLVED SEVERAL SEVERITY LEVEL III VIOLATIONS. BOTH TRAINS OF THE CONTROL ROOM EMERGENCY VENTILATION SYSTEM (CREVS) WERE REMOVED ON APRIL 23, 1984 THROUGH MAY 7, 1984 WITHOUT VERIFYING THE OPERABILITY OF REDUNDANT EQUIPMENT. THIS RENDERED THE CREVS INOPERABLE IN VIOLATION OF TECHNICAL SPECIFICATION REQUIREMENTS. SEVERAL EXAMPLES OF FAILURES TO FOLLOW PROCEDURES REGARDING THE OPERATION OF THE STARTUP FEED PUMP WERE ALSO IDENTIFIED. IN ADDITION, THREE EXAMPLES INVOLVING CHANGES IN THE FACILITY AS DESCRIBED IN THE SAFETY ANALYSIS REPORT WERE IDENTIFIED. NO WRITTEN SAFETY EVALUATION OF WHETHER THE CHANGE INVOLVED

A CHANGE IN THE TECHNICAL SPECIFICATIONS OR AN UNREVIEWED SAFETY QUESTION WAS PREPARED AS REQUIRED BY 10 CFR 50.59. THE CIVIL PENALTY WAS PAID ON JANUARY 14, 1985.

B. A NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTIES IN THE AMOUNT OF $13,000 WAS ISSUED ON JUNE 20, 1980 AND INVOLVED THREE ITEMS OF NONCOMPLIANCE INCLUDING AN OVEREXPOSURE TO RADIATION DUE TO INADEQUATE CONTROL OF ACCESS TO A HIGH RADIATION AREA NEAR THE REACTOR CAVITY. THE VIOLATIONS WERE NOT CATEGORIZED ACCORDING TO SEVERITY LEVEL BECAUSE THEY PREDATED THE EXISTING ENFORCEMENT POLICY. THE CIVIL PENALTY WAS PAID ON JULY 10, 1980.

QUESTION 21: NRC'S MOST RECENT SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE REPORT ON DAVIS-BESSE NOTED THAT IMPROVEMENT WAS NEEDED IN 5 OF 11 AREAS. THE REPORT CONCLUDED THAT "STRONG STEPS ARE NEEDED TO RAISE THE PERFORMANCE LEVEL AT THE DAVIS-BESSE FACILITY." SPECIFICALLY WHAT ACTIONS HAS NRC TAKEN?

ANSWER:

THE FOLLOWING ACTIONS HAVE BEEN TAKEN SINCE DECEMBER 1984 TO IMPROVE THE LICENSEE'S PERFORMANCE.

1. INSPECTION ACTIVITIES HAVE BEEN INCREASED AND FOCUSED ON SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE (SALP) CATEGORY 3 FUNCTIONAL AREAS AND OTHER FUNCTIONAL AREAS WHERE PERFORMANCE LEVEL WAS PERCEIVED AS DECLINING. THE PURPOSE OF THESE INSPECTIONS IS TO DETERMINE THE ROOT CAUSE(S) OF POOR PERFORMANCE AND DETERMINE IF PLANNED LICENSEE CORRECTIVE ACTIONS ADDRESS THE ROOT CAUSES. ARE LIKELY TO BE EFFECTIVE, AND ARE APPROPRIATELY SCHEDULED.

2. The Regional Administrator met with the Chief Executive Officer on December 28, 1984 to discuss weaknesses in licensee's performance. The Regional Administrator urged the Chief Executive Officer to obtain experienced support from outside the Toledo Edison Company in order to achieve needed improvement.

3. Commissioner Asselstine visited the Davis-Besse facility on January 11, 1985, to make first hand observations and support NRC efforts to improve licensee's performance.

4. The Regional Administrator briefed the Commissioners on the performance problems at Davis-Besse during a Commission meeting with the Office Directors and Regional Administrators on January 29, 1985.

5. The Chief Executive Officer and members of his staff met with the Regional Administrator and members of his staff on March 6, 1985. The licensee presented its action plan to address the SALP findings and to improve performance. The action plan addressed management initiatives to improve performance in the areas of plant operations, maintenance, training, quality assurance and administrative controls, fire protection and emergency planning.

6. The Chief Executive Officer and members of his staff met with the Executive Director for Operations, involved Office Directors and the Regional Administrator on May 17, 1985. The licensee discussed his determination and plan to improve performance.

7. An Enforcement Conference was held by Region III with the licensee on May 24, 1985, to discuss three recent operational events which continued to show weak licensee performance. An escalated enforcement action is being processed at this time.

8. Monthly meetings are being held with the licensee to monitor its progress in implementing the Performance Enhancement Program (PEP). The PEP is a program initiated by the licensee in late 1983 to improve regulatory performance at the Davis-Besse facility.

As a result of these efforts, improvements in licensee performance have been noted, but overall progress has been slow. Region III is closely following the licensee's actions through an augmented inspection program and the monthly meetings. Further, the Toledo Edison Company announced on June 18, 1985, the appointment of a new Company President and Senior Vice President, Nuclear. This change was obviously designed, in part, to strengthen performance.

QUESTION 22: WHAT ARE THE ROOT CAUSES OF MANAGEMENT PROBLEMS NOTED BY NRC AT DAVIS-BESSE? WHAT STEPS SHOULD BE TAKEN TO CORRECT THESE PROBLEMS? PROVIDE ANY DOCUMENTS INCLUDING INTERNAL MEMORANDA THAT RELATE TO NRC CONCERNS ABOUT DAVIS-BESSE'S REGULATORY PERFORMANCE.

ANSWER:

WE ARE NOT SURE THAT WE HAVE IDENTIFIED ALL ROOT CAUSES OF THE MANAGEMENT PROBLEMS AT DAVIS-BESSE. THE FOLLOWING ARE OUR CURRENT VIEWS:

1. THE CHIEF EXECUTIVE OFFICER, THE PRESIDENT, THE VICE PRESIDENT, NUCLEAR, THE ASSISTANT VICE PRESIDENT, NUCLEAR AND THE PLANT MANAGER WERE NOT AN EFFECTIVE TEAM IN IDENTIFYING PROBLEMS OR IN SOLVING PROBLEMS AT DAVIS-BESSE ONCE THEY HAD BEEN IDENTIFIED.

2. THERE ARE SOME INDICATIONS THAT THE COMPANY'S FINANCIAL INVOLVEMENT IN OTHER NUCLEAR PROJECTS NECESSITATED BUDGET RESTRAINTS AT DAVIS-BESSE.

3. THE CHIEF EXECUTIVE OFFICER WAS NOT SUFFICIENTLY INVOLVED IN THE DAVIS-BESSE OPERATION PRIOR TO THE SALP REPORT OF DECEMBER 1984.

4. ALTHOUGH THE COMPANY AND ITS CONSULTANTS WERE CAPABLE OF DEVELOPING ELABORATE PROGRAMS FOR RESOLVING PERFORMANCE DEFICIENCIES ONCE PROBLEMS WERE IDENTIFIED, MANAGEMENT WAS INEFFECTIVE IN IMPLEMENTING SUCH PROGRAMS.
5. THERE IS A LACK OF CORPORATE SUPPORT TO THE NUCLEAR MISSION IN SUCH AREAS AS PROCUREMENT AND PERSONNEL.

STEPS ARE CURRENTLY IN PROGRESS TO ADDRESS THESE PROBLEMS. THE CHIEF EXECUTIVE OFFICER IS NOW DEEPLY INVOLVED IN THEIR RESOLUTION AND HAS PLEDGED HIS PERSONAL ATTENTION AND COMPANY RESOURCES TO RESOLVE THEM. SIGNIFICANT MANAGEMENT CHANGES HAVE BEEN MADE BY APPOINTING A NEW PRESIDENT AND SENIOR VICE PRESIDENT, NUCLEAR. SIGNIFICANT NRC EFFORT IS BEING FOCUSED ON IDENTIFICATION OF ROOT CAUSES OF THOSE FUNCTIONAL AREAS WITH SALP 3 PERFORMANCE RATINGS AND ON CLOSELY FOLLOWING THE PROGRESS OF CORRECTIVE ACTION PROGRAMS, TO ASSURE THAT ACTIONS ARE SUFFICIENT.

DOCUMENTS, INCLUDING INTERNAL MEMORANDA THAT RELATE TO NRC CONCERNS ABOUT DAVIS-BESSE'S REGULATORY PERFORMANCE ARE CONTAINED IN ENCLOSURE 4. INSPECTION REPORTS HAVE NOT BEEN PROVIDED SINCE THEY ARE VOLUMINOUS AND ARE A MATTER OF PUBLIC RECORD.

ENCLOSURE 4: ATTACHMENTS SUPPORTING QUESTION 22

INDEX OF DOCUMENTS

RESPONSE TO QUESTION 22

1979

04/30/79	LETTER: J. Keppler - TECo: Transmits Report 79-08 (attached), report of enforcement conference on 04/18/79 discussing administrative and operating regulatory performance. (5 pgs.)
06/15/79	LETTER: J. Keppler - TECo: Transmits Report 79-12 (attached), report of meeting 05/31/79 (2nd of series) regarding immediate and long-term improvements in regulatory performance. (9 pgs.)
07/10/79	NOTICE: Significant licensee meeting 07/17/79, to discuss implementation of additional management controls. (1 pg.)
08/06/79	LETTER: J. Keppler - TECo: Transmits Report 79-20 (attached), report of meeting 07/17/79 (3rd of series) regarding immediate and long-term improvements in regulatory performance. (7 pgs.)
08/19/79	NOTES: Notes for TECo meeting 08/19/79. (5 pgs.)
09/10/79	NOTICE: Significant licensee meeting 09/19/79, to discuss TECo program to improve management control and operations. (1 pg.)
09/12/79	LETTER: J. Keppler - TECo: Confirms meeting schedule for 09/19/79 meeting. (1 pg.)
10/15/79	LETTER: J. Keppler - TECo: Transmits Report 79-26 (Attached) report of meeting 09/19/85 (4th of Series) regarding immediate and long-term improvements in regulatory performance. (8 pgs.)

1980

02/13/80	LETTER: T. N. Tambling - R. F. Heishman: Status Update of Davis-Besse Corrective Actions to improve Management Controls and Plant Operations. (5 pgs.)
02/16/80	LETTER: J. Keppler - TECo: Confirmation Letter of meeting between TECo and NRC. (1 pg.)
02/17/80	LETTER: Davis-Besse Reactor Operators - R. Crouse Loss of Qualified Operators and request to meet with Crouse to Discuss this. (2 pgs.)
03/31/80	LETTER/INSPECTION REPORT: J. Keppler - TECo: Cover letter to Inspection Report which is a series of management meetings. (6 pgs.)
04/23/80	LETTER: J. Keppler - N. C. Moseley (IE): Description of Davis-Besse Event of April 19, 1980. (4 pgs.)
05/80	Summary of Physical Security Inspections at Davis-Besse. (6 pgs.)
05/13/80	LETTER: R. W. Reid - TECo: Notice of Enclosed NUREG Documents. (1 pg.)
05/27/80	LETTER: J. Keppler - TECo: Confirmation Letter between TECo and NRC. (1 pg.)
05/27/80	NOTICE: Significant Licensee Meeting 06/04/80 to discuss Management, Security, and Radiation Protection Enforcement Conference. (1 pg.)
06/04/80	OUTLINE: Management Meeting on 06/04/84. (1 pg.)
06/20/80	LETTER: V. Stello - TECo: Proposing Civil Penalties due to overexposure on 04/30/80. (2 pgs.)
07/10/80	LETTER/INSPECTION REPORT: J. Keppler - TECo meeting and enforcement conference summary for 06/04/80. (14 pgs.)
07/18/80	LETTER: J. S. Creswell - J. F. Ahearne: Summary of Inspector's concerns. (2 pgs.)
11/18/80	LETTER: J. Keppler - Attached address listing: Enclosed Performance Appraisal Branch (not attached). (1 pg.)
11/26/80	LETTER: J. Keppler - TECo: Confirmation of 12/05/80 meeting to discuss regulatory performance. (1 pg.)
11/26/80	LETTER: M. Johnson (TECo) - V. Stello: Response to Performance Appraisal Team. (1 pg.)

11/03/80	LETTER: J. Keppler - TECo: Confirmation of meeting to discuss the evaluation of Regulatory Performance. (1 pg.)
12/08/80	LETTER: J. Keppler - R. F. Heishman: Performance Appraisal Branch Inspection of Davis-Besse. (1 pg.)
12/31/80	LETTER/INSPECTION REPORT: J. Keppler - TECo: Refers to management meeting 12/05/80 and NRC Summary. (9 pgs.)

1981

01/21/81	LETTER: V. Stello - TECo: Transmits Report 80-3 (PAS) Performance Appraisal Section Report. Executive summary and report cover sheet attached. (5 pgs.)
03/03/81	MEMO: N. Mosely - V. Stello: Davis-Besse PAS Inspection Transmits Assessment Report. Evaluation of IE Program and Regional Implementation attached. (14 pgs.)
05/01/81	MEMO: J. Keppler - N. Moseley: Disposition of inspection findings resulting from the Davis-Besse PAS Inspection. Report 81-03, Notice of Violation, Notices of Deviation, Memo from J. Keppler to J. Sniezek (04/22/81) attached. (15 pgs.)
05/08/81	LETTER: TECo - J. Keppler: Response to concerns resulting from PAS Inspection. Cover sheet only attached. (2 pgs.)
03/11/81	LETTER: J. Keppler - TECo: Confirms meeting scheduled for 03/17/81 at Regional Office. (1 pg.)
03/25/81	MEMO: E. Brach - W. Rogers: Management visit to Davis-Besse. Thank you for cooperation and support. (1 pg.)
06/10/81	LETTER: J. Keppler - TECo: Express appreciation for cooperation in meeting 05/26/81. Comments helpful in recognizing impact of NRC initiatives. (1 pg.)
07/08/81	LETTER: TECo - J. Keppler: Confirms discussions. Have initiated corrective action plans as a result of evaluation of inadvertent reactor trip 06/24/81. (3 pgs.)

1982

01/15/82	LETTER: R. Spessard - TECo: Confirms meeting plans for 01/21/82 at Regional Office. (1 pg.)
01/20/82	MEMO: J. Keppler - R. Spessard: Recent inspection findings at Davis-Besse. Importance of borated water storage overtemperature. (1 pg.)
02/25/82	LETTER: R. Spessard - TECo: Transmits Report 82-05 (DRP1), report of management meeting on 01/21/82 at Region III to discuss drawing control, nonconformance reports, personnel errors. Report cover sheet only attached. (3 pgs.)
04/30/82	LETTER: C Paperiello - TECo: Thank you for response to items in your letter of 04/20/82. (1 pg.)
07/30/82	LETTER: TECo - J. Hind: TECo comments on SALP Report. acknowledges SALP, takes issue with conclusions in one area. (2 pgs.)
09/08/82	LETTER: J. Keppler - TECo: Confirms conversation discussing security matters. Region III personnel available to discuss matters. (1 pg.)
09/23/82	LETTER: J. Keppler - TECo: Transmits final SALP Report and provides overall observations on Regulatory performance (Report not attached). (3 pgs.)

1983

03/24/83	LETTER: C. Norelius - TECo: Transmits report 83-06 (attached), report of enforcement conference on 03/09/83 discussing maintenance drawing control and equipment operability. (5 pgs.)
07/07/83	LETTER: J. Hind - TECo: Confirms meeting date of 07/12/83 for presentation of SALP report. (2 pgs.)
07/08/83	MEMO: C. Norelius - R. Spessard: Requests inspection of QA program at Davis-Besse Station. (1 pg.)
07/18/83	LETTER: R. Crouse - NRC (J. Stolz): Provides status report on TECo activities towards developing and implementing a Davis-Besse Station Integrated Living Schedule Program (ILSP). (4 pgs.)
10/17/83	LETTER: V. Gilinsky - J. Williamson: Discusses results of plant tour at Davis-Besse Station. (1 pg.)
09/20/83	LETTER: R. Crouse - NRC (J. Stolz): Informs NRC of delay in submitting ILSP until October 1983. (2 pgs.)
10/28/83	MEMO: W. Schultz - J. Axelrad: Forwards documents to NRC HQ regarding proposed civil penalty on fire protection issues. (24 pgs.)
10/28/83	LETTER: J. Williamson - V. Gilinsky: Responds to Gilinsky letter of 10/17/83 on plant tour. (3 pgs.)
10/31/83	LETTER: C. Norelius - TECo: Confirms a meeting date of 11/04/83 to discuss the Regulatory Improvement Program (RIP) at Davis-Besse Station. (1 pg.)
11/07/83	MEMO: A. Davis - W. Shafer: Notes from 11/4/83 meeting on RIP at Davis-Besse. (2 pgs.)
11/21/83	LETTER: LRS consultants (C. Rice) - R. DeYoung: Comments on safety performance of Davis-Besse Station in regard to V. Gilinsky site tour. (1 pg.)
11/23/83	MTG NOTICE: Announces enforcement conference on 12/01/83 to discuss Appendix R inspection at Davis-Besse Station (confirmation letter to licensee attached). (2 pgs.)
11/23/83	LETTER: A. Davis - TECo: Transmits report No. 83-23(DPRP) discussing management meeting on 11/04/83 with TECo. (6 pgs.)
12/07/83	MEMO: A. Davis - T. Rehm: Transmits copy of inspection report No 83-23 and copy of a draft memo forwarding the report thru EDO office to Commissioner Gilinsky. (8 pgs.)

12/09/83	MEMO: W. Schultz - J. Axelrad: Requests review and concurrence on proposed enforcement action regarding one train of ECCS equipment. (10 pgs.)
12/12/83	MEMO: W. Dircks - Commissioner Gilinsky: Transmits copy of inspection report No. 83-23 to SMSN office (was in draft form in 12/07/83 memo above). (1 pg.)
12/16/83	LETTER: R. Crouse - J. Keppler: Transmits requested information from MTG on Appendix R (12/01/83) enforcement conference. (23 pgs.)
12/23/83	LETTER: C. Norelius - TECo: Provides clarification of NRC views presented at 12/14/83 MTG with TECo on status of regulatory enhancement program. (2 pgs.)
12/29/83	LETTER: J. Haverly - W. Little: Transmits information to supplement 12/16/83 submittal from TECo on Appendix R. (49 pgs.)
09/06/83	MEMO: R. Spessard - E. Pawlik: Recommends an OI investigation of Davis-Besse Appendix R inspection findings. (2 pgs.)

1984

01/06/84	LETTER: C. Norelius - TECo: Confirmation of meeting to review comprehensive enhancement program on 01/10/84. (1 pg)
01/20/84	LETTER: R. Crouse - J. Stolz: Letter explaining "Draft Integrated Living Schedule Program Plan for Davis-Besse Nuclear Power Plant Station" (not attached). (2 pgs.)
02/02/84	MEMO: W. Schultz - J. Axelrad: Enclosed documents proposing civil penalty action. Supersedes 10/28/83 document. (23 pgs.)
05/16/84	LETTER: P. McLaughlin - H. Booher: Trip report to Davis-Besse.
06/20/84	LETTER: A. DeAgazio - G. C. Lainas: Third AFW pump/diesel generator at Davis-Besse plus attachment on safety evaluation report. (3 pgs.)
07/05/84	LETTER: W. Shafer - C. Norelius: Trip report discussing Davis-Besse training organization and programs. (3pgs)
07/07/84	LETTER: C. Norelius - TECo: Confirmation of enforcement conference on 07/13/84. Will deal with personnel errors. (1 pg.)
07/11/84	NOTICE OF VIOLATION: R. Spessard - TECo (3 pgs.)
07/11/84	LETTER/INSPECTION REPORT: R. Spessard - TECo: Special inspection of quality assurance program. (40 pgs.)
07/16/84	LETTER: R. Crouse - J. Stolz: Transmittal letter for integrated living schedule program for NRC approval (not attached). (2 pgs.)
07/18/84	LETTER: R. Crouse - C. Norelius: Current status of TECo's comprehensive corrective action program in maintenance area.
07/20/84	LETTER: R. Peters - W. Shafer: status of performance enhancement program (attached). (40 pgs.)
07/24/84	MEMO: I. Jackiw - Region III Files: Perf. Enhancement Program - Trip Rpt. McLaughlin to Booker (sic) dated 05/16/84.
08/17/84	LETTER: R. Crouse - C. Norelius: Response to violations from inspection report 07/11/84. (10 pgs.)
08/25/84	NOTES: R. Walker - W. Shafer: Davis-Besse PAT team exit.
08/84	PERFORMANCE APPRAISAL REPORT. (45 pgs.)
09/06/84	MEMO: C. Norelius - J. Hind: Possible equipment intentionally mispositioned. (1 pg.)

09/07/84	LETTER: R. Spessard - TECo: TECo steps taken to correct noncompliance. (1 pg.)
09/11/84	LETTER: INSPECTION REPORT: C. Norelius - TECo: Special Inspection. (12 pgs.)
09/14/84	LETTER: R. Crouse - J. Keppler: Status of performance enhancement program (attached). (31 pgs.)
09/14/84	MEMO: W. Schultz - J. Axelrad: Proposed civil penalties on poor management. Actions and inspection report (attached). (25 pgs.)
09/21/84	MEMO: K. Seyfrit - C. Norelius: Evaluation of LERS 04/01/83 to 08/31/84. EOD input to SALP review. (1 pg.)
10/02/84	MEETING NOTES: SALP summary rating (attached). (13 pgs.)
10/03/84	LETTER: R. Crouse - C. Norelius: Response to violations from inspection report dated 09/07/74 (not attached). (3 pgs.)
10/09/84	MEMO: A. DeAgazio - G. Lainas: Backfit issue at Davis-Besse on Auxiliary Feedwater System. (3 pgs.)
10/18/84	MEMO: A. Davis - R. Spessard: Performance appraisal inspection at Davis-Besse. Meeting set up. (1 pg.)
10/24/84	MEMO: L. Callan - J. Grace: Assessment of implementation of the NRC inspection report. Enclosures not attached. (1 pg.)
10/30/84	LETTER: J. Keppler - TECo: Regulatory performance not improving enough at Davis-Besse. (2 pgs.)
11/15/84	MEMO: J. Grace - C. Norelius: D. B. performance appraisal inspection potential enforcement findings. Includes D. B. Enforcement Conference draft. (52 pgs.)
11/28/84	MEMO: S. Chilk - W. Dircks: Commission inputs for the training policy statement. (1 pg.)
11/29/84	LETTER: R. Crouse - C. Norelius: Response to violations to NRC July 11, 1984 letter. (2 pgs.)
12/06/84	LETTER: J. Keppler - TECo: SALP 4 board report for TECo review (SALP attached). (39 pgs.)
12/14/84	LETTER: R. Crouse - R. DeYoung: Response to performance Appraisal Inspection 84-19. All attachments included. (32 pgs.)
12/26/84	LETTER: J. Taylor - TECo: Extension for response to alleged violations. Letter attached. (21 pgs.)
12/84	REGULATORY PERFORMANCE: History April 1979 - October 1984. (9 pgs.)

1985

01/02/85	MEMO: J. Asselstine - W. Dircks: Training Program at Davis-Besse Nuclear Plant Training as Category 3, Suggest Staff Monitor Closely (2 pgs.)
02/04/85	LETTER: TECo - J. Keppler: Response to SALP Report. Low ratings came as a shock, not argue with assessments, devote energy to a program of improvement. (3 pgs.)
01/04/85	Speech Outline from SALP Meeting. (3 pgs.)
01/09/85	MEMO: J. Keppler - W. Dircks: Inform of Regulatory Performance. Chronology of performance, starting in 1979. (2 pgs.)
01/17/85	LETTER: J. Keppler - TECo: Refers to meeting 12/28/84. Discussing regulatory concerns. Previous letter 10/30/84 attached. (3 pgs.)
01/31/85	MEMO: H. Thompson - H. Denton: Training Program at Davis-Besse. Proposes training review. Memos of 01/30/85 (Draft?) and 12/12/85 attached. (3 pgs.)
01/31/85	LETTER: TECo - J. Keppler: Response to PAT Report 84-19 item on general employee training. Will revise. (1 pg.)
02/08/85	MEMO: J. Keppler - W. Dircks, H. Denton, J. Taylor: Davis-Besse SALP Response: Transmits TECo response to SALP. Believe have attention and commitment of top licensee management. TECo response attached. (19 pgs.)
02/19/85	MEMO: J. Keppler - C. Norelius: Training Program at Davis-Besse Nuclear Plant. Memo from W. Dircks to Commissioner Asselstine (02/12/85) attached. Please factor commitments into master inspection plan. (4 pgs.)
02/26/85	MEMO: W. Shafer - C. Norelius: Trip Report - Davis-Besse: Meeting 02/07-08/85 to discuss licensee's performance enhancement program. 55 action plans to meet with licensee first Thursday of each month. Action plans attached. (59 pgs.)
03/04/85	OUTLINE: Management Assessment Team: Objectives, proposed plan, team members, schedules, (Draft) TECo organization charts attached. (6 pgs.)
03/04/85	LETTER: TECo - J. Keppler: Supplemental information to response to SALP report requested by phone call 02/19/85. Supplemental information attached. (31 pgs.)
03/06/85	LETTER: J. Axelrad - TECo: Acknowledge letter of 01/14/85 and check of $90,000. Letter of 01/14/85 and attachments. (15 pgs.)

03/06/85	OUTLINE: Toledo Edison SALP Presentation, Region III 03/06/85. (43 pgs.)
03/08/85	LETTER: W. Little - TECo: Transmits Report 85-01, Followup on Findings in PAT Report 84-09. Report 85-01 attached. (13 pgs.)
03/13/85	LETTER: J. Partlow - TECo: Response to PAT Inspection: Pleased to receive response, disappointed response only addressed identified specific details. Region III closely monitoring. No further response requested. (1 pg.)
03/15/85	MEMO: A. Davis - J. Keppler: Visit to Davis-Besse on March 15, 1985: Discussions with operators, their suggestions. (1 pg.)
03/18/85	LETTER: R. Spessard - TECo: Transmits Report 85-05(DRS). First in a planned series to provide in-depth review and evaluation of corrective program and its implementation. Program acceptable, increased management attention needed. Report attached. (11 pgs.)
03/25/85	MEMO: E. Brach - W. Rogers: Mgmnt. Visit to Davis-Besse.
03/28/85	PRINTOUT: PEP Implementation Tracking System. (5 pgs.)
04/02/85	LETTER: TECo - J. Keppler: Mentions 03/06/85 meeting. Provides charter and membership of SALP improvement task force. Attachments. (11 pgs.)
04/23/85	LETTER: Transmits SALP Report. Discusses overall view of corrective actions proposed. Continued management needed. SALP Report 84-11 attached. (58 pgs.)
05/14/85	LETTER: R. Spessard - TECo: Transmits Inspection Report No. 85007(DRS) (2 pgs.)
05/15/85	Draft Notes on Plant Status
05/16/85	LETTER: R. Spessard - TECo: Transmits Inspection Report (attached) No. 85012(DRS) (10 pgs.)
05/24/85	Meeting Notes for Enforcement Conference on 05/24/85 (Draft Notice of Violation included) (10 pgs.)
06/05/85	MEMO: J. Keppler - W. Dircks: Status of Regulatory Performance at Davis-Besse Nuclear Plant.
06/11/85	MEMO: J. Keppler - W. Dircks: Status of Regulatory Performance at Davis-Besse Nuclear Plant.
06/18/85	MEMO: W. Schultz - J. Axelrad: TECo - Davis-Besse Proposed Civil Penalties.

BEST COPY

UNKNOWN DOCUMENT INDEX

Date Unknown: Agenda for SALP Meeting (3 pgs.)

Date Unknown: Toledo Edison SALP Presentation (15 pgs.)

QUESTION 23: PLEASE PROVIDE ALL DOCUMENTS INCLUDING INTERNAL NRC STAFF MEMORANDUM WHICH RELATE TO THE DAVIS-BESSE INCIDENT. YOUR RESPONSE SHOULD PROVIDE ALL DOCUMENTS GENERATED BY THE NRC TASK FORCE INVESTIGATING THIS MATTER INCLUDING TRANSCRIPTS OF INTERVIEWS WITH EMPLOYEES OF TOLEDO EDISION.

ANSWER:

DOCUMENTS IN THE POSSESSION OF THE NRC FACT-FINDING TEAM ARE NOT BEING FORWARDED AT THIS TIME. THIS INFORMATION IS BEING EVALUATED AND CONSIDERED AS AN INTEGRAL PART OF THE NRC FACT-FINDING TEAM, AND ALL PERTINENT BACKGROUND DOCUMENTS, INCLUDING THE TRANSCRIPTS OF INTERVIEWS, WILL BE RELEASED AT THE TIME THE TEAM'S REPORT IS PUBLICLY ISSUED. THE TEAM'S REPORT IS CURRENTLY SCHEDULED TO BE ISSUED TO THE COMMISSION AND THE EDO ON JULY 24, 1985.

ENCLOSURE 3 CONTAINS THE FOLLOWING DOCUMENTS RELATING TO THE DAVIS-BESSE INCIDENT:

Question 23. (Continued)

1.	Daily Highlight - Davis Besse Unit No. 1	6/11/85
2.	Preliminary Notification of Event or Unusual Occurrence, Davis Besse - Loss of Feedwater To Steam Generators (PNO-III-85-47)	6/10/85
3.	Preliminary Notification of Event or Unusual Occurrence, Davis Besse - Loss of Feedwater To Steam Generators - Update (PNO-III-85-47A)	6/11/85
4.	Preliminary Notification of Event or Unusual Occurrence Davis Besse - Loss of Feedwater to Steam Generators (PNO-III-85-47B)	6/13/85
5.	Event Description - Reportable Event Number 01084 (01:33)	6/9/85
6.	Event Description - Reportable Event Number 01087 (14:15)	6/9/85
7.	RIII - Daily Report - Davis Besse	6/10/85
8.	RIII - Daily Report - Davis Besse	6/11/85
9.	RIII - Daily Report - Davis Besse	6/12/85
10.	RIII - Daily Report - Davis Besse	6/13/85
11.	RIII - Daily Report - Davis Besse	6/14/85
12.	RIII - Daily Report - Davis Besse	6/17/85
13.	RIII - Daily Report - Davis Besse	6/18/85
14.	RIII - Daily Report - Davis Besse	6/19/85
15.	RIII - Daily Report - Davis Besse	6/21/85
16.	Confirmatory Action Letter To TECO from Keppler	6/10/85
17.	Slide presented at NRR/OR Events Briefing (Davis Besse - Loss of All Main Feedwater and Auxiliary Feedwater)	6/12/85

QUESTION 23. (CONTINUED) - 3 -

18.	MEETING TRANSCRIPT - MEETING BETWEEN NRC STAFF AND TECO CONCERNING AFW SYSTEMS		6/17/85
19.	MEMO:	L. G. HULMAN TO W. MINNERS	6/18/85
	SUBJECT:	POTENTIAL PERSON - REMS FROM A CORE MELT CAUSED BY LOSS-OF-FEEDWATER AT DAVIS BESSE	
20.	MEMO:	L. RUBENSTEIN TO G. LAINAS	6/18/85
	SUBJECT:	DAVIS BESSE 1 - CHRONOLOGY RELATING TO THIRD, DIVERSE POWERED AFW PUMP	
21.	MEMO:	H. THOMPSON, JR. TO J. KEPPLER, ET. AL.	6/19/85
	SUBJECT:	CONGRESSIONAL INQUIRIES CONCERNING THE DAVIS BESSE INCIDENT	
22.	MEMO:	H. THOMPSON, JR. TO H. DENTON	6/20/85
	SUBJECT:	DEGREE OF COMPLIANCE OF DAVIS BESSE 1 WITH TMI ITEMS	
23.	RIII -	DAILY REPORT - DAVIS BESSE	6/24/85
24.	RIII -	DAILY REPORT - DAVIS BESSE	6/20/85
25.	GENERAL INSPECTION GUIDELINES		6/15/85
26.	MEMO:	JAMES G. KEPPLER, REGIONAL ADMINISTRATOR FOR A. BERT DAVIS, DEPUTY REGIONAL ADMINISTRATOR DATED JUNE 17, 1985 "TELECON" WITH RICHARD UDELL.	6/12/85
27.	MEMO:	J. G. KEPPLER FROM C. E. NORELIUS DATED JUNE 21, 1985 "REGION III STUDY GROUP."	6/21/85

28. Sequence of Events
    Region III sequence of events: Two sequences; dated June 9 and June 12, 1985. Licensee Sequence of Events: Two sequences; dated June 9 and June 13, 1985.
    Davis-Besse Systems Composite
    Simplified Sequence of Major Events
    Davis-Besse Regulatory Performance History
    FFT Sequence of Events
    PNO-III-85-45
    TMI Auxiliary Feedwater System Status Davis-Besse
    Review of LER's Summary Davis-Besse
    Auxiliary Feedwater System Operating Experience
    Mgmnt. Sequence of Events
29. Logbook Entry Sheet (TECo) No. E85-152A Records Results of Piping Walkdown on 06/13/85 @ 0930 hrs (1 pg.) 6/13/85
30. Updated Sequence of Events for 06/09/85 Trip (source unknown) (6 pgs.) 6/14/85
31. Attachment 1 to Revision 1 (source document unknown) Titled "Equipment Freeze;" Discusses Equipment in Quarantine (2 pgs.) 6/15/85
32. Intra-company Memo (Rev. 1) (TECo) J. Wood - Action Item Lead Individuals; Provides Guidelines When Troubleshooting or Investigating 06/09/85 Reactor Trip (3 pgs.) 6/15/85
33. Intra-company Memo (Rev. 2) (TECo) J. Wood - Action Item Individuals: Revises Rev. 1 of Same Memo (item just mentioned) (5 pgs.) 6/15/85

QUESTION 23. (CONTINUED)

34.	REPORT: J. LONG (AUTHOR): "AUXILIARY FEEDWATER SYSTEM VALVE PROBLEM ANALYSIS (AF 599 & AF 608)" (5 PGS.)	6/16/85
35.	TYPED NOTES NRC GENERATED - (AUTHOR UNKNOWN): FAILURE EVALUATION FOR AUXILIARY FEEDWATER VALVES AF-599 AND AF-608 (3 PGS.)	UPDATED
36.	REPORT: J. DESANDO (AUTHOR): "NI-2 COUNT RATE LEVEL INDICATION FAILURE ANALYSIS" (5 PGS.)	6/17/85
37.	REPORT: M. BORYSIAK (AUTHOR): "ACTION PLAN REPORT FOR NI-1 SOURCE RANGE CHANNEL" (6 PGS.)	6/17/85
38.	SEQUENCE OF EVENTS (REV. 0) NRC FACT FINDING TEAM: GIVES SEQUENCE OF EVENTS AS OF 3:00 P.M. ON 06/18/85 (6 PGS.)	6/18/85
39.	REPORT: M. RAYNES (AUTHOR): "TURBINE BYPASS VALVE 2-2 (SP 13A2) PROBLEM ANALYSIS" (4 PGS.)	6/18/85
40.	REPORT: D. WILCZYNSKI, ET AL (AUTHOR): "AUXILIARY FEED PUMPS OVERSPEED TRIPS" (13 PGS.)	6/20/85
41.	MEMO: W. DIRCKS, EDO, TO THE COMMISSION CONCERNING THE SEQUENCE OF EVENTS AT DAVIS-BESSE	6/12/85

QUESTION 24. AT THE SUBCOMMITTEE'S APRIL 17, 1985, BUDGET AUTHORIZATION HEARING, THE COMMISSION TESTIFIED THAT SOME PLANTS DOMINATE THE PROBABILITY OF A SEVERE ACCIDENT AS REPORTED IN THE COMMISSION'S 45 PERCENT ESTIMATE OF A CORE MELTDOWN AT A U.S. REACTOR IN THE NEXT 20 YEARS. IS DAVIS-BESSE ONE OF THOSE PLANTS? WHAT FACTORS ARE IMPORTANT IN IDENTIFYING THOSE PLANTS MOST LIKELY TO HAVE A SEVERE ACCIDENT? WHAT FACILITIES HAS THE COMMISSION IDENTIFIED AS MOST LIKELY TO HAVE A SEVERE ACCIDENT AND WHAT ACTIONS HAS THE COMMISSION TAKEN AT EACH?

ANSWER.

THE ESTIMATE OF A 45 PERCENT CHANCE OF SEVERE CORE DAMAGE OR MELTDOWN WITHIN A POPULATION OF 100 PLANTS OVER A 20 YEAR PERIOD WAS BASED UPON THE SIX MOST RECENT AND THOROUGH PRAs TO BE SUBMITTED BY THE LICENSEES TO THE NRC. THESE PLANTS ARE NOT THOUGHT TO BE MORE LIKELY THAN AVERAGE TO HAVE CORE DAMAGE. DAVIS-BESSE WAS NOT AMONG THEM.

THE VARIATIONS IN PROJECTED CORE MELT FREQUENCY AMONG PRAs

SUGGEST THAT SOME PLANTS ARE MORE LIKELY THAN OTHERS TO INCUR SEVERE CORE DAMAGE OR MELTDOWN. THE CAUSES OF THE DIFFERENCES IN ESTIMATED ACCIDENT FREQUENCY LIE IN THE DETAILS OF PLANT DESIGN, EQUIPMENT RELIABILITY IN SERVICE, AND OPERATIONS, SUCH AS PROCEDURES, MAINTENANCE AND OPERATOR PERFORMANCE. THE DIFFERENCES DO NOT CORRELATE STRONGLY WITH EASILY IDENTIFIED FEATURES SUCH AS MAKE OF THE REACTOR, ARCHITECT-ENGINEER, DATE OF LICENSING, OR UTILITY. PERFORMANCE OF A PLANT-SPECIFIC PRA APPEARS TO BE THE MOST RELIABLE MEANS OF IDENTIFYING THE PLANTS WITH THE GREATEST SUSCEPTIBILITY. THE NRC HAS NOT YET SYSTEMATICALLY SCREENED ALL OPERATING PLANTS TO IDENTIFY AND CORRECT OUTLIERS (THOSE WITH UNUSUALLY HIGH SUSCEPTIBILITY) BUT INTENDS TO DO SO IN THE IMPLEMENTATION OF THE SEVERE ACCIDENT POLICY.

THE NRC HAS ORDERED PRAS OF PLANTS AT THE SITES OF HIGHEST POPULATION DENSITY. IN EACH CASE THE OWNERS OF THE PLANTS HAVE VOLUNTEERED IMPROVEMENTS FOR THE MORE PROMINANT CONTRIBUTORS TO RISK. FOR EXAMPLE, INDIAN POINT UNIT 2 MADE ALTERATIONS TO DIMINISH THE VULNERABILITY OF THE CONTROL BUILDING TO EARTHQUAKE DAMAGE AND TO FIRE, AND A PROCEDURE TO SHUT THE

QUESTION 24 (CONT.)

PLANT DOWN WAS INSTITUTED IN THE EVENT THAT A HURRICANE THREATENS THE SITE. THE NRC HAS FOUND IT UNNECESSARY TO ORDER IMPROVEMENTS BEYOND THOSE VOLUNTEERED BY THE LICENSEES ONCE A PRA REVEALED THE PROBLEM.

WE DO NOT YET KNOW WHETHER DAVIS-BESSE IS AN OUTLIER, AND IT WILL BE EVALUATED AS PART OF OUR SYSTEMATIC ASSESSMENT OF REACTORS IN ACCORDANCE WITH THE SEVERE ACCIDENT POLICY. THERE ARE PRELIMINARY INDICATIONS THAT ITS CORE DAMAGE OR MELT FREQUENCY MAY WELL BE ABOVE AVERAGE. THERE ARE NO INDICATIONS THAT THE FREQUENCY OF SEVERE RELEASES - AND THUS OFFSITE RADIOLOGICAL RISK - IS ABOVE AVERAGE.

COMMISSIONER ASSELSTINE ADDS THE FOLLOWING:

WITH REGARD TO WHICH PLANTS ARE MOST LIKELY TO HAVE A SEVERE ACCIDENT, I BELIEVE THAT THERE ARE AT LEAST TWO CONTRIBUTORS THAT ARE AMONG THE MOST IMPORTANT; NAMELY, POOR DESIGN AND POOR MAINTENANCE AND OPERATIONS. THEY ARE BROUGHT TOGETHER AT DAVIS BESSE. THERFORE, MY PRELIMINARY VIEW IS THAT DAVIS BESSE IS ONE OF THOSE PLANTS THAT DOMINATE THE PROBABILITY OF A SEVERE ACCIDENT.

NINETY-NINTH CONGRESS

EDWARD J. MARKEY, MASSACHUSETTS, CHAIRMAN

AL SWIFT, WASHINGTON
JOHN BRYANT, TEXAS
MICKEY LELAND, TEXAS
RICHARD C. SHELBY, ALABAMA
RON WYDEN, OREGON
RALPH M. HALL, TEXAS
DENNIS E. ECKART, OHIO
GERRY SIKORSKI, MINNESOTA
JOHN D. DINGELL, MICHIGAN
(EX OFFICIO)

CARLOS J. MOORHEAD, CALIFORNIA
MICHAEL G. OXLEY, OHIO
HOWARD C. NIELSON, UTAH
MICHAEL BILIRAKIS, FLORIDA
FRED J. ECKERT, NEW YORK
JAMES T. BROYHILL, NORTH CAROLINA
(EX OFFICIO)

LAWRENCE R. SIDMAN
CHIEF COUNSEL AND STAFF DIRECTOR

ROOM H2-316
HOUSE OFFICE BUILDING ANNEX NO. 2
PHONE (202) 226-2424

U.S. HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON ENERGY CONSERVATION
AND POWER
OF THE
COMMITTEE ON ENERGY AND COMMERCE
WASHINGTON, DC 20515

June 27, 1985

The Honorable Nunzio J. Palladino
Chairman
Nuclear Regulatory Commission
1717 H Street, NW
Washington, D. C. 20555

Dear Mr. Chairman:

The Subcommittee's recent briefing on the June 9, 1985 loss of feedwater at Davis-Besse has heightened my concern about this incident and about the failure of the Nuclear Regulatory Commission (NRC) to require needed improvements at the plant in both management and hardware.

As I stated in my June 17, 1985 letter, I believe that NRC must determine the extent to which it is responsible for allowing Davis-Besse to suffer such a close call. I would like to be informed of what internal investigation will be undertaken and request a copy of your final report as soon as it is completed. Any investigation should examine NRC's responses to the history of management deficiencies at the plant and the known deficiencies in the auxiliary feedwater system. In my view, this investigation would be enhanced were it headed by an individual outside of NRC who will be recognized as independent.

The Subcommittee's own investigation is ongoing. I continue to expect your response to the questions contained in my June 17, 1985 letter by the deadline that has been established. Attached are some additional questions which should be answered within ten working days or no later than July 12, 1985.

I would like to take this opportunity to express my support for those actions that I understand the Commission has taken to date, including initiating the Task Force investigation and the Confirmation of Action Letter issued by Region III. These appear to be prudent first steps. I encourage you to proceed vigorously and expeditiously.

The Subcommittee is interested in what steps the NRC will require prior to authorizing a restart of Davis-Besse. With regard to each of the following six action areas, please advise the Subcommittee of whether the Commission will allow a restart before each is completed. To the extent that one or more of these measures are not deemed necessary, then please provide a detailed explanation of the technical basis for continued operation pending completion of that item:

1. Determination of the cause of each failure during the incident, the root cause(s) of the incident and compliance with any corrective actions;
2. Implementation of short-term management improvements prior to restart and contracting for a third party audit of plant management to be complete within six months;
3. Installation of a third train or at least a third pump in the auxiliary feedwater system that is automatic, safety grade and assures compliance of the system with the General Design Criteria and Standard Review Plan;
4. Determination of what emergency procedures should be used during such an incident and compliance with any corrective actions;
5. Determination of whether the licensee submitted complete and accurate information to the NRC during and following the incident and if not, determine why and take any corrective action necessary;
6. Accomplishment of each of the above in a safe and effective manner that does not pose any new safety problem.

Obviously, your response to these questions should be provided to the Subcommittee prior to the actual restart of Davis-Besse.

Additionally, please report to the Subcommittee on the generic implications of the Davis-Besse incident and any corrective actions deemed necessary. In this context, I would appreciate additional information regarding an April 17, 1984 NRC Staff memorandum that appears to indicate that no Babcock & Wilcox reactor auxiliary feedwater system fully complies with NRC regulations and standards (see question #1 below).

In advance, thank you for your prompt response to the attached questions.

Sincerely,

Ed Markey

Edward J. Markey
Chairman

EJM:mw

Attachment

Questions for the Nuclear Regulatory Commission

1. According to an April 17, 1984 memorandum from L. S. Rubenstein, Assistant Director for Core and Plant Systems, to Gus C. Lainas, Assistant Director for Licensing, no Babcock & Wilcox (B&W) reactor meets the reliability criteria of the Standard Review Plant Section 10.4.9. Each of the B&W plants was cited for also failing to meet one or more General Design Criteria.

   a. Why are these plants allowed to operate if they fail to comply with the General Design Criteria and Standard Review Plan?

   b. Were exemptions or amendments granted for each plant, and if so on what basis?

   c. In terms of the probability of a loss of main feedwater, loss of auxiliary feedwater or the likelihood of loss of feedwater leading to a severe core damage accident, how do B&W reactors compare to other designs?

2. Given the repeated recommendations for upgrading the auxiliary feedwater system at Davis-Besse to include a third diverse drive auxiliary feedwater pump, on what basis has this recommendation not yet been implemented? Specifically, does the Commission believe that it is acceptable that the NRC has been unable to resolve this issue for six years?

3. According to a September 28, 1984 memorandum from Harold R. Denton, Director of the Office of Nuclear Reactor Regulation, to William J. Dircks, Executive Director for Operations, the NUREG-0667 recommendation for a diverse drive auxiliary feedwater pump at Davis-Besse was never implemented because the Auxiliary Systems Branch determined that it was not necessary. Please provide any such analysis or recommendation by the Auxiliary Systems Branch and all related documents. Additionally, please reconcile this statement with a March 12, 1985 memorandum from Olan D. Parr, Chief of the Auxiliary Systems Branch to John F. Stolz, Chief of the Operating Reactors Branch No. 4, that states: "We are delighted that the licensee [has decided to add] this third, motor driven pump."

4. According to a January 16, 1984 memorandum for Ashok C. Thadani, Chief of the Reliability & Risk Assessment Branch, to Olan Parr, Chief of the Auxiliary Systems Branch, the average probability of a core meltdown initiated by a loss of main feedwater is approximately 1 in 2,000 per reactor year (5.4×10^{-4}). Given current plant configurations, is the Commission aware of any single accident sequence at any plant that poses

as high a probability of resulting in core damage?

5. Toledo Edison has finally decided to upgrade the auxiliary feedwater system by installing a third diverse drive auxiliary feedwater pump at Davis-Besse. Please provide the following information:

   a. Will the modification constitute a new train of auxiliary feedwater or just a new pump? What other options are possible? Please state the relative advantages and disadvantages of all options.

   b. How will the new pump feed water to the steam generators and will it be fitted with valves and piping to provide water in more than one manner?

   c. Will the new system and pump be safety grade?

   d. Will the new system be designed to function during a loss of offsite power event and if so, how?

   e. Will the new system be automatic or manually initiated?

6. During the Subcommittee's June 21, 1985 briefing, Harold Denton, Director of the Office of Nuclear Reactor Regulation, stated that the performance of the feedwater systems at Davis-Besse was worse than that projected by probalistic risk assessments (PRA). What is the reason for this discrepancy and what generic implications does this have for the degree of confidence ascribed to PRA?

7. At the beginning of the Davis-Besse incident on June 9, 1985, how many operators and which ones were in the control room? During the incident how many operators were outside the control room or stationed post, what were their titles, why did they leave the control room or stationed post, and specifically what actions were actually accomplished outside of the control room. In light of those actions that needed to be taken from outside the control room, is Davis-Besse meeting General Design Criterion 19 which states:

   > "A control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions...."

8. According to the NRC Staff, feed and bleed procedures for emergency cooling were initiated during the Davis-Besse incident. Numerous NRC memoranda state that feed and bleed emergency cooling is not capable of averting core damage at Davis-Besse. Why then are feed and bleed procedures part of the NRC approved emergency operating procedures for this plant? In responding to this question please state whether such a procedure would lengthen the time before core

uncovering and damage (and if so by how much) and whether undertaking such an effort is desirable given other priorities facing the operators.

9. Given the demonstrated likelihood of a total loss of feedwater at B&W reactors, why does the NRC consider this type of incident to be beyond the design basis? What is the technical basis for considering a potential failure or accident sequence as a design basis event?

10. List every regulation, requirement, recommendation, General Design Criteria, Standard Review Plan item, Branch Technical Position, Confirmatory Action Letter item, licensing commitment, TMI Action Plan item, NUREG-0667 recommendation, or any other item that Davis-Besse was not in full and complete compliance with on June 9, 1985.

11. According to a June 19, 1985 memorandum from C. J. Heltemes Jr., Director of the Office of Analysis and Evaluation of Operational Data, to William J. Dircks, Executive Director for Operations, the Safety Parameter Display System (SPDS) was inoperable at time of the Davis-Besse incident. The SPDS system was to be installed at Davis-Besse in accordance with the TMI Action Plan in order to provide reactor operators with minimum information which defines the safety parameters of the plant. Please state: (a) when this system was to have been operational according to the TMI Action Plan; (b) when it became operational at Davis-Besse; (c) why this system was inoperable during the Davis-Besse incident; and (d) will it be operable prior to restart?

12. List separately those plants that do not have auxiliary feedwater systems that are fully safety grade, those that have only two auxiliary feedwater pumps and those that have auxiliary feedwater pumps powered only by one source.

13. What, if any, plants are not in full compliance with the TMI Action Plan items relating to auxiliary feedwater systems?

14. Provide the current status of implementation of all recommendations of NUREG-0667 at each plant to which they are applicable.

15. After concerns were raised by Commissioner Gilinsky and then Region III in 1983, Toledo Edison pledged to take steps to improve its regulatory performance and management. According to the NRC Staff, these measures were ineffective. Why didn't the NRC take action to require effective improvements and has the NRC determined why those actions that were taken were not effective? Additionally, what measures does the Commission plan to take now to assure regulatory and management improvements and how will they differ from those taken over the past two years?

16. Should cost-benefit analysis be used to decide whether to require a safety improvement that would bring a nuclear reactor into compliance with NRC regulations?

17. What is the role of cost-benefit analysis in deciding whether to require a safety improvement at a nuclear reactor. Your response should answer the following questions: (a) how and what uncertainties are factored into any such analyses; (b) what costs are considered in any such analysis; (c) what costs are not considered in any such analysis; (d) what benefits are considered in any such analysis; and, (e) what benefits are not considered in any such analysis?

18. Should cost-benefit analysis be used to decide whether to require Davis-Besse to install a third auxiliary feedwater pump when it does not meet the Standard Review Plan reliability criterion and when no other U.S. reactor has the same design vulnerability of only two steam driven pumps?

19. Does the Committee to Review Generic Requirements and the Executive Director for Operations have any authority over the decisions and judgements of the Director of Nuclear Reactor Regulation to require safety improvements at nuclear reactors?

20. Please provide the following information:

    a. An estimate of how much would it have cost Toledo Edison to have installed, in 1980, the pump that is now planned to be installed in 1986? How much will the pump and its installation cost in 1986?

    b. How much did Toledo Edison pay for the reliability analysis by EDS Nuclear Inc.?

    c. How much did NRC pay for the Brookhaven study which evaluated the EDS reliability analysis?

    d. An estimate of how much Toledo Edison has expended since 1979 on improvements to the auxiliary feedwater system that were used to justify not installing a third auxiliary feedwater pump?

    e. An estimate of the cost and staff hours expended by the NRC since 1980 to evaluate whether Davis-Besse should install a third auxiliary feedwater pump.

    f. What has the June 9, 1985 incident cost Toledo Edison up till now? Please include an estimate of replacement power costs per day.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

OFFICE OF THE
CHAIRMAN

July 24, 1985

The Honorable Edward J. Markey, Chairman
Subcommittee on Energy Conservation and Power
Committee on Energy and Commerce
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in response to your letter of June 27, 1985 regarding the Davis Besse Nuclear power plant.

In regard to your request for an internal review, the Commission will certainly review the circumstances at Davis Besse to determine if NRC needs to address its means of regulation to reduce the possibility of incidents of this nature. No formal report is anticipated, but we will advise you of the results of our consideration.

Commissioner Asselstine believes that in view of the seriousness of the questions raised by the June 9, 1985 event at Davis Besse regarding the performance of NRC, an independent investigation is warranted.

You also asked that you be provided information on the steps that NRC will require prior to authorizing a restart of Davis Besse:

As indicated in our response to your June 17, 1985 questions, the NRC will assure that it is satisfied that the plant can be operated safely before it is restarted. This finding will be based on the effectiveness of the corrective actions and other improvements made to the existing AFW system in restoring it to the same quality standards assumed in the original licensing decision. In addition, the fact finding team sent to the Davis Besse site will develop information regarding the event and areas needing improvement. These recommendations will also be considered prior to a restart decision. The six action areas you have identified will be among the issues that will be considered by NRC prior to restart of Davis Besse.

In addition to completing the plant specific corrective actions on Davis Besse, we will determine the generic implications of the Davis Besse incident. The fact finding team is also charged with making generic recommendations which will be considered in our determinations.

Our response to your questions regarding the compliance of B&W plants with NRC regulations and standards is addressed in the answer to Question 1 herein.

The responses to the questions you appended to your letter are attached.

Sincerely,

Nunzio J Palladino

Nunzio J. Palladino
Chairman

Attachment: Responses to Questions from June 27, 1985 letter

cc: Rep. Carlos Moorhead

QUESTION 1: ACCORDING TO AN APRIL 17, 1984 MEMORANDUM FROM L. S. RUBENSTEIN, ASSISTANT DIRECTOR FOR CORE AND PLANT SYSTEMS, TO GUS C. LAINAS, ASSISTANT DIRECTOR FOR LICENSING, NO BABCOCK & WILCOX (B&W) REACTOR MEETS THE RELIABILITY CRITERIA OF THE STANDARD REVIEW PLANT SECTION 10.4.9. EACH OF THE B&W PLANTS WAS CITED FOR ALSO FAILING TO MEET ONE OR MORE GENERAL DESIGN CRITERIA.

A. WHY ARE THESE PLANTS ALLOWED TO OPERATE IF THEY FAIL TO COMPLY WITH THE GENERAL DESIGN CRITERIA AND STANDARD REVIEW PLAN?

ANSWER:

THE PLANTS DISCUSSED IN THE MEMORANDUM FROM L. S. RUBENSTEIN TO GUS C. LAINAS, DATED APRIL 17, 1984, WERE ALL LICENSED PRIOR TO THE ACCIDENT AT TMI-2. THOSE PLANTS MET THE GENERAL DESIGN CRITERIA AS THEY WERE INTERPRETED WHEN THE PLANTS RECEIVED THEIR OPERATING LICENSES AND CONTINUE TO DO SO. AFTER THE ACCIDENT, CERTAIN REQUIREMENTS WERE SET FORTH IN NUREG-0737, "CLARIFICATION OF TMI ACTION PLAN REQUIREMENTS." ITEM II.E.1.1 OF NUREG-0737

REQUIRED A REEVALUATION OF THE AUXILIARY FEEDWATER SYSTEMS (AFWS) AGAINST THE CURRENT CRITERIA OF SRP SECTION 10.4.9 AND BTP ASB 10-1. WHILE THE OPERATING PLANTS MAY NOT MEET THE CURRENT CRITERIA, WHICH WERE DEVELOPED AFTER THEIR LICENSING, THE DESIGN OF THOSE PLANTS REGARDING THE CURRENT CRITERIA WERE IDENTIFIED FOR FUTURE CONSIDERATION BY THE STAFF AND POSSIBLE BACKFIT DETERMINATIONS. IN THE CASE OF THE DAVIS-BESSE PLANT, THE REQUIREMENT FOR A THIRD AFWS WAS CONSIDERED AS A BACKFIT.

THESE PLANTS WERE ALLOWED TO OPERATE BECAUSE THEY WERE NOT FOUND TO BE UNSAFE AND CONTINUED TO MEET THE INTERPRETATION OF THE GDC WHICH WERE IN EFFECT AT THE TIME THE PLANTS WERE LICENSED. THE APRIL 17, 1984 MEMORANDUM CITES AREAS WHERE EACH OF THE B&W PLANTS DID NOT MEET CERTAIN GENERAL DESIGN CRITERIA (GDC); HOWEVER, THIS WAS BASED ON NOT MEETING THE CURRENT CRITERIA FROM THE STANDARD REVIEW PLAN. THIS DID NOT MEAN THAT THE B&W PLANTS WERE NOT IN COMPLIANCE WITH THE GDCS APPLICABLE TO THESE PLANTS WHEN LICENSED. THE NEW STANDARD REVIEW PLAN ELEMENTS RELATED TO AFW SYSTEMS SPELL OUT THE BASIS FOR REVIEW OF A NEW PLANT NOT YET LICENSED. THE MINIMUM OF THESE REQUIREMENTS WHICH NEEDS TO BE SATISFIED ON A LICENSED PLANT, SUCH AS DAVIS-BESSE, IS SPELLED OUT IN NUREG-0737. THE IMPROVEMENTS IN SAFETY REQUIRED BY THE COMMISSION FOLLOWING THE TMI-2 ACCIDENT WERE IMPOSED ON

ALL PLANTS INCLUDING OPERATING PLANTS, IN NUREG-0737. THOSE REQUIREMENTS AND IMPLEMENTATION SCHEDULES DERIVED FROM THE NUREG-0737 REVIEW HAVE OR ARE BEING MET BY ALL THE B&W LICENSEES. WITH RESPECT TO THE AFW SYSTEMS, ALL OF THE B&W PLANTS HAVE MET THE NUREG-0737 REQUIREMENTS, EXCEPT FOR A) RANCHO SECO AND TMI-1 WHICH HAVE SCHEDULED COMPLETION AT THE NEXT REFUELING OUTAGES, AND B) ARKANSAS 1 WHICH HAS PROPOSED ADDITIONAL MODIFICATIONS BEYOND THOSE PREVIOUSLY REVIEWED AND APPROVED BY THE STAFF. IN SUMMARY, THE ORIGINAL LICENSING REQUIREMENTS PLUS THE NUREG-0737 REQUIREMENTS ARE ALL THAT ARE NEEDED TO MEET THE COMMISSION'S REGULATIONS REGARDING AUXILIARY FEEDWATER.

COMMISSIONER ASSELSTINE ADDS:
THE AUXILIARY FEEDWATER SYSTEM (AFS) OF PLANTS LICENSED BEFORE AROUND 1977 WERE NOT REQUIRED TO MEET THE PROVISIONS OF GDC-34 OR -44, BECAUSE UP UNTIL THEN THE STAFF PRACTICE WAS TO EXAMINE THE TOTALITY OF WAYS OF REMOVING DECAY HEAT (E.G., VIA THE RESIDUAL HEAT REMOVAL SYSTEM). SUBSEQUENTLY, THE STAFF MADE THE DETERMINATION THAT GDC-34 SHOULD APPLY TO THE AFS, BUT THE PLANTS THAT WERE ALREADY OPERATING OR FOR WHICH THE SAFETY REVIEWS HAD ESSENTIALLY BEEN COMPLETED WERE "GRANDFATHERED" FROM THE THEN NEW INTERPRETATION OF GDC-34. LIKEWISE, WHEN THE STANDARD REVIEW PLAN WAS MODIFIED TO INCLUDE A RELIABILITY CRITERION FOR THE AFS, ALL PLANTS ALREADY LICENSED WERE

"GRANDFATHERED". THUS, UNDER THE COMMISSION'S CURRENT PRACTICES, THE STAFF WOULD HAVE TO DEMONSTRATE THAT SUBSTANTIAL ADDITIONAL OVERALL PROTECTION IS NEEDED AT THOSE OPERATING PLANTS PREVIOUSLY GRANDFATHERED BEFORE IT COULD REQUIRE THEM TO CONFORM WITH GDC-34 OR THE RELIABILITY CRITERION AND THIS WOULD ENTAIL A COST-BENEFIT ANALYSIS OF THE MERITS OF SUCH A BACKFIT. IT APPEARS TO ME THAT THERE WERE ERRORS IN JUDGMENT ON THE LICENSING OF THE PLANTS THAT WERE "GRANDFATHERED", BUT THE COMMISSION'S CURRENT BACKFITTING PRACTICES GET IN THE WAY OF CORRECTING THOSE ERRORS.

QUESTION 1.B WERE EXEMPTIONS OR AMENDMENTS GRANTED FOR EACH PLANT, AND IF SO ON WHAT BASIS?

ANSWER:

NO EXEMPTIONS WERE CONSIDERED NECESSARY.

QUESTION 1.c IN TERMS OF THE PROBABILITY OF A LOSS OF MAIN FEEDWATER, A LOSS OF AUXILIARY FEEDWATER OR THE LIKELIHOOD OF LOSS OF FEEDWATER LEADING TO A SEVERE CORE DAMAGE ACCIDENT, HOW DO B&W REACTORS COMPARE TO OTHER DESIGNS?

ANSWER.

THE RESPONSE TO THIS QUESTION IS DEPENDENT ON PLANT-SPECIFIC FEATURES THAT ARE MOST OFTEN INFLUENCED BY THE BALANCE OF PLANT DESIGN AND NOT THE REACTOR VENDOR. THIS WAS QUITE EVIDENT IN THE EVALUATION OF AUXILIARY FEEDWATER SYSTEMS (AFW) FOR A SINGLE REACTOR VENDOR (WESTINGHOUSE) IN NUREG-0611 WHICH SHOWED A LARGE SPREAD IN ESTIMATED RELIABILITY FOR SYSTEMS HAVING THREE PUMPS. MOST OF THE OPERATING B&W PLANTS HAVE TWO AUXILIARY FEEDWATER PUMPS AND FEED AND BLEED CAPABILITY (THE CAPABILITY TO REMOVE DECAY HEAT DIRECTLY VIA THE PRIMARY SYSTEM.

THE IMPORTANT FACTORS ARE THE CONFIGURATION OF SECONDARY HEAT REMOVAL SYSTEM (NUMBER OF TRAINS AND DIVERSITY) AND THE VIABILITY OF FEED AND BLEED. THESE FACTORS VARY WITHIN A REACTOR TYPE AND THEREFORE A COMPARISON OF B&W REACTORS TO OTHER REACTOR DESIGNS IS NOT DIRECTLY AVAILABLE. RANGES OF ESTIMATED FREQUENCIES DEVELOPED FROM VARIOUS GENERIC AS WELL AS PLANT SPECIFIC STUDIES FOR LOSS OF MAIN FEEDWATER EVENTS LEADING TO SEVERE CORE DAMAGE ARE AS FOLLOWS:

PLANTS WITH TWO PUMP AFW SYSTEMS AND NO FEED AND BLEED CAPABILITY	2×10^{-4} TO 6×10^{-4}/RY

PLANTS WITH TWO PUMP AFW SYSTEMS AND FEED AND BLEED CAPABILITY	10^{-5} TO 10^{-4}/RY
PLANTS WITH THREE PUMP AFW SYSTEMS AND FEED AND BLEED CAPABILITY	10^{-6} TO 10^{-5}/RY

IN SUMMARY, IT CAN BE SAID THAT THOSE PLANT DESIGNS WITH A TWO PUMP AFWS AND LACKING FEED AND BLEED CAPABILITY COMPARE UNFAVORABLY TO THOSE REACTORS WITH A GREATER DEPTH OF DEFENSE AGAINST LOSS OF FEEDWATER SCENARIOS. THIS IS TRUE FOR ANY VENDOR'S PLANTS, NOT JUST B&W REACTORS. NOTE ALSO THAT DIFFERENCES IN EQUIPMENT RELIABILITY IN SERVICE MAY BE AS IMPORTANT AS DESIGN VARIANTS IN GOVERNING SYSTEM RELIABILITY OR ACCIDENT LIKELIHOOD.

COMMISSIONER ASSELSTINE ADDS:

THE COMMISSION CLAIMS THAT MOST B&W PLANTS HAVE "FEED AND BLEED CAPACITY". THIS ISSUE WAS EXTENSIVELY LITIGATED IN THE TMI-1 RESTART PROCEEDING. SEE, 17 NRC 814 (1983). THE STAFF TESTIFIED IN THAT PROCEEDING THAT STAFF DID NOT RELY ON FEED AND

BLEED TO PROVIDE ADEQUATE CORE COOLING IN THE EVENT OF A SMALL BREAK LOCA OR MAIN FEEDWATER TRANSIENT. FOLLOWING IS THE APPEAL BOARD DECISION ON THIS MATTER:

> "(I)T WAS LEFT TO THE STAFF TO DEMONSTRATE THE RELIABILITY OF FEED AND BLEED. WE FIND THAT THE STAFF WAS UNABLE TO MAKE SUCH A DEMONSTRATION. PLAINLY THE FEED AND BLEED PROCESS IS CONCEPTUALLY VALID. THE STAFF, HOWEVER, WAS UNABLE TO RESOLVE NUMEROUS ANALYTICAL UNCERTAINTIES WITH REGARD TO THE PROCESS. AS A CONSEQUENCE, WE ARE UNABLE ON THIS RECORD TO ENDORSE FEED AND BLEED AS A RELIABLE BACKUP SYSTEM OF DECAY HEAT REMOVAL." 17 NRC 814 (1983), PP.822-23.

THE COMMISSION DID NOT MODIFY THAT APPEAL BOARD DECISION. IT APPEARS THAT THE COMMISSION IS NOW RELYING ON THE FEED AND BLEED MODE OF CORE COOLING EVEN THOUGH ITS OWN APPEAL BOARD, WHICH CAREFULLY EXAMINED THE TECHNICAL MERITS OF THE ISSUE, WOULD NOT ENDORSE THE PROCESS, AT LEAST FOR ONE B&W PLANT.

WITH REGARD TO THE JULY 17, 1985 RESPONSES TO YOUR LETTER OF JUNE 17, 1984, QUESTION 5 ASKED FOR THE IDENTITY OF ALL PWR'S FOR WHICH FEED AND BLEED HAS BEEN DEMONSTRATED, USING SAFETY EVALUATIONS PERFORMED IN ACCORDANCE WITH ESTABLISHED NRC REQUIREMENTS, TO BE AN ADEQUATE METHOD OF CORE COOLING. THE RESPONSE IDENTIFIES EIGHT B&W PLANTS, INCLUDING TMI-1, AS HAVING ADEQUATE FEED AND BLEED CAPABILITY. BASED ON THE ABOVE APPEAL BOARD DECISION, IT APPEARS THAT FOR TMI-1 THE ADEQUACY OF THE

FEED AND BLEED MODE OF CORE COOLING HAS NOT BEEN DEMONSTRATED. FURTHER, FOR THE OTHER PLANTS LISTED IN THAT RESPONSE, IT IS NOT CLEAR WHETHER THE ANALYSES PERFORMED WERE BASED ON SAFETY EVALUATIONS PERFORMED IN ACCORDANCE WITH ESTABLISHED NRC REQUIREMENTS. I WOULD HAVE TO CONCLUDE, THEREFORE, THAT IT IS NOT CLEAR THAT THE ADEQUACY OF FEED AND BLEED HAS BEEN DEMONSTRATED FOR ANY PLANT.

QUESTION 2 GIVEN THE REPEATED RECOMMENDATIONS FOR UPGRADING THE AUXILIARY FEEDWATER SYSTEM AT DAVIS-BESSE TO INCLUDE A THIRD, DIVERSE-DRIVE AUXILIARY FEEDWATER PUMP, ON WHAT BASIS HAS THIS RECOMMENDATION NOT YET BEEN IMPLEMENTED? SPECIFICALLY, DOES THE COMMISSION BELIEVE THAT IT IS ACCEPTABLE THAT THE NRC HAS BEEN UNABLE TO RESOLVE THIS ISSUE FOR SIX YEARS?

ANSWER

THE LONG EXCHANGE WITH THE LICENSEE, AND AMONG THE STAFF REGARDING THE THIRD AUXILIARY FEEDWATER PUMP ISSUE IS A RESULT OF DIFFERING JUDGEMENTS ON THE MOST EFFECTIVE WAY OF IMPROVING AUXILIARY FEEDWATER RELIABILITY. THE YEARS THAT IT HAS TAKEN TO RESOLVE THE ISSUES SURROUNDING THE UPGRADE OF THE AUXILIARY FEEDWATER SYSTEM AT DAVIS BESSE IS UNUSUAL AND UNDESIRABLE. THE LICENSEE PROVIDED STUDIES THAT PROPOSED MORE COST EFFECTIVE ALTERNATES (BASED ON THE LICENSEE'S ANALYSIS) TO ACHIEVE ACCEPTABLE RELIABILITY GOALS. THE DETAILS REGARDING THE LICENSEE STUDIES, STAFF REVIEWS INCLUDING A NRC-SPONSORED BROOKHAVEN NATIONAL LABORATORY

STUDY AND EFFORT NEEDED TO JUSTIFY GENERIC BACKFIT FOR A THIRD PUMP REQUIREMENT ARE PROVIDED HEREIN. EVEN AT THIS TIME, THE LICENSEE'S COMMITMENT FOR THE INSTALLATION OF A THIRD PUMP IS NOT BASED ON THE RESULTS OF A RELIABILITY ANALYSIS BUT THE NEED TO RELOCATE THE STARTUP FEEDWATER PUMP TO RESOLVE SAFETY CONCERNS ABOUT HIGH AND MODERATE ENERGY LINE BREAKS IN THE AUXILIARY BUILDING THAT COULD EFFECT THE AUXILIARY FEEDWATER SYSTEM.

THE EARLIEST REFERENCE TO IMPOSING A REQUIREMENT FOR DIVERSE-DRIVE FOR THE AFW PUMPS AT DAVIS-BESSE APPEARS IN THE STAFF SAFETY EVALUATION WHICH WAS TRANSMITTED WITH NRC LETTER DATED JULY 6, 1979. IN THAT SAFETY EVALUATION, THE STAFF TOOK NOTE OF TOLEDO EDISON COMPANY'S AGREEMENT TO CONTINUE TO REVIEW AFW SYSTEM PERFORMANCE TO ASSURE RELIABILITY, AND CONSISTENT WITH THAT LONG TERM AGREEMENT, WOULD REQUIRE THE ADDITION OF A 100% CAPACITY ELECTRIC-MOTOR DRIVEN AFW PUMP. THE STAFF SPECIFICALLY HELD OPEN THE OPTION FOR OTHER ALTERNATIVES TO THE 100% CAPACITY DIVERSE-DRIVE PUMP.

SUBSEQUENTLY, THE B&W REACTORS TRANSIENT TASK FORCE RECOMMENDED THE EXPEDITED INSTALLATION OF THE 100% CAPACITY DIVERSE DRIVE PUMP AT DAVIS-BESSE. THE BASIS FOR THE RECOMMENDATION WAS THAT AN INTERRUPTION OF FEEDWATER FLOW CAN RESULT IN STEAM GENERATOR

DRY-OUT WHICH WOULD RESULT IN LOSS OF STEAM PRESSURE TO DRIVE THE AFW PUMP TURBINES. DIVERSITY OF AFW PUMP POWER WAS NOT AN EXPLICIT REQUIREMENT FOR DAVIS-BESSE WHEN IT WAS LICENSED. THE SRP REQUIREMENTS FOR DIVERSITY IN BTP-10-1 WAS ADOPTED SUBSEQUENT TO DAVIS-BESSE BEING LICENSED. NRR INITIALLY CONSIDERED ISSUING AN ORDER REQUIRING THE INSTALLATION OF THE ELECTRIC MOTOR DRIVEN PUMP. HOWEVER THE DECISION WAS MADE TO AWAIT THE RESULTS OF A RELIABILITY STUDY BEING PERFORMED BY THE LICENSEE AND NOT TO ISSUE THE ORDER. IT WAS FELT, AT THE TIME, THAT A RELIABILITY STUDY WOULD DEMONSTRATE THE RELATIVE IMPROVEMENT IN RELIABILITY TO BE GAINED THROUGH THE INSTALLATION OF THE ADDITIONAL PUMP VS. OTHER SYSTEM MODIFICATIONS WHICH COULD ELIMINATE DOMINANT FAILURE CONTRIBUTORS.

THE RELIABILITY STUDY WAS SUBMITTED DECEMBER 1981. THE LICENSEE'S CONCLUSION WAS THAT THE ADDITION OF A THIRD TRAIN OF AFW WOULD NOT IMPROVE RELIABILITY OF AFW AS MUCH AS WOULD OTHER MODIFICATIONS TO THE EXISTING SYSTEM TO ELIMINATE THE DOMINANT FAILURE CONTRIBUTORS

DURING THIS TIME, NO SPECIFIC ANALYSES HAD BEEN PERFORMED BY OR FOR THE NRC THAT COULD JUSTIFY, IN A QUANTITATIVE MANNER, AN ORDER FOR THE THIPD PUMP. THE NRC PROCEEDED TO REVIEW THE LICENSEE'S RELIABILITY STUDY AND HAD BROOKHAVEN NATIONAL LABORATORY PREPARE AN INDEPENDENT EVALUATION. CONCURRENTLY, WORK HAD

STARTED ON THE PREPARATION OF A PACKAGE FOR CRGR CONSIDERATION WHICH, IF APPROVED BY THE CRGR, WOULD REQUIRE THE INSTALLATION OF A DIVERSE-DRIVE PUMP ON ALL PLANTS WHICH DO NOT HAVE ONE. PRESENTATION OF THIS PACKAGE TO CRGR HAS BEEN DELAYED, PRIMARILY TO ENSURE THE STAFF HAS AN ADEQUATE JUSTIFICATION FOR RECOMMENDATION.

COMMISSIONER ASSELSTINE ADDS:

I BELIEVE IT IS UNACCEPTABLE THAT THIS AGENCY HAS BEEN UNABLE TO RESOLVE THE ISSUE OF WHETHER REQUIRING DIVERSE MEANS FOR REMOVING DECAY HEAT FROM A REACTOR IS REASONABLE. THE STAFF'S INITIAL INSTINCTS ON THIS ISSUE, THAT DIVERSE MEANS SHOULD BE REQUIRED, APPEAR TO BE RIGHT ON THE MARK. THE FACT THAT THE MATTER HAS REMAINED MIRED IN THE MORASS OF "COST-BENEFIT ANALYSES" FOR THE LAST SEVERAL YEARS IS ILLUSTRATIVE OF THE PROBLEMS ASSOCIATED WITH THE COMMISSION'S POLICIES, PRACTICES AND DECISIONS ON BACKFITTING.

QUESTION 3. According to a September 28, 1984 memorandum from Harold R. Denton, Director of the Office of Nuclear Reactor Regulation to William J. Dircks, Executive Director for Operations, the NUREG-0667 recommendation for a diverse drive auxiliary feedwater pump at Davis-Besse was never implemented because the Auxiliary Systems Branch determined that it was not necessary. Please provide any such analysis or recommendation by the Auxiliary Systems Branch and all related documents. Additionally, please reconcile this statement with a March 12, 1985 memorandum from Olan D. Parr, Chief of the Auxiliary Systems Branch to John F. Stolz, Chief of the Operating Reactors Branch No. 4, that states: "We are delighted that the licensee [has decided to add] this third, motor driven pump."

ANSWER.

The purpose of the September 28, 1984 memorandum was to closeout TMI Issue II.E.5.2 due to issuance of NUREG-0667 in May 1980. In addition a status report was provided on the implementation of the 22 NUREG-0667 recommendations. The information in the September 28, 1984 memorandum from Harold R. Denton to William J. Dircks pertaining to Davis-Besse diverse drive auxiliary feedwater

Question 3. (Continued) - 2 -

pumps was based on an erroneous interpretation of status information provided by an individual in Auxiliary Systems Branch (ASB) in July 1982 on this issue. This status information related to a licensee submittal concluding that the third pump was not needed. The September 28, 1984 memorandum was prepared by a newly appointed lead project manager for the TMI Action Plan Item II.E.5.2. In the course of transferring the responsibility for this task, several discussions were held and numerous documents changed hands on the 22 recommendations involved. The status for Davis Besse was based on these discussions and a status note on the recommendation for a third AFW pump saying "Licensee submitted info and indicated that DIVERSE-DRIVE AFW IS NOT NEEDED." Since their status was provided by ASB, the new lead project manager concluded that the issue had already been resolved and that the Auxiliary Systems Branch had agreed that the diverse-drive pump was not needed. While ASB was sent copies of this memorandum, no one in ASB noted the incorrect status.

In fact, a review of the Auxiliary Systems Branch activities during 1984, as documented in the memoranda already provided to the Subcommittee, clearly indicates a consistent desire by the Auxiliary Systems Branch to require the licensee to add the third pump. A memo correcting this status has been sent to the EDO.

MARKEY/NRR
Revised 7/16/85

THE AUXILIARY SYSTEMS BRANCH WAS NOT AWARE OF THE CLOSEOUT OF TMI ACTION PLAN ITEM II.E.5.2, AND CONSEQUENTLY IT DID NOT INFLUENCE THEIR THEN ONGOING ACTIONS REGARDING THE NEED FOR ADDING THE THIRD PUMP.

MARKEY/NRR
REVISED 7/16/85

QUESTION 4. According to a January 16, 1984 memorandum from Ashok C. Thadani, Chief of the Reliability and Risk Assessment Branch, to Olan Parr, Chief of the Auxiliary Systems Branch, the average probability of a core meltdown initiated by a loss of main feedwater is approximately 1 in 2,000 per reactor year ($5.4\text{x}10^{-4}$). Given current plant configurations, is the Commission aware of any single accident sequence at any plant that poses as high a probability of resulting in core damage?

ANSWER.

No, the Commission is not aware of any other single accident sequence at any plant that could result in core damage and which currently has an estimated frequency as high as $5\text{x}10^{-4}$/RY. PRAs have revealed instances of accident sequences with frequencies above $5\text{x}10^{-4}$/RY, but none remain so high today. In most cases, changes by the plant owners substantially reduced the vulnerabilities revealed by the PRA.

Commissioner Asselstine adds:
The attached Table 1 from the January 16, 1984 memorandum referenced in the question provides estimates of the core meltdown frequencies due to the loss of main feedwater at 10

PLANTS. I FIND THOSE ESTIMATES, PARTICULARLY WHEN ONE CONSIDERS THE UNCERTAINTIES, TO BE UNACCEPTABLY HIGH FOR THE REMAINING LIFE OF THE PLANTS. UNFORTUNATELY, THE COMMISSION FINDS, THROUGH ITS SEVERE ACCIDENT POLICY STATEMENT, THE CORE MELTDOWN RISKS TO BE ACCEPTABLE.

Attachment Question 4

TABLE 1

ESTIMATES OF CORE MELT FREQUENCY (PER YEAR) AND ASSOCIATED UNCERTAINTIES DUE TO LOSS OF MAIN FEEDWATER EVENT

Plant	Median	Error Factor	Mean
Prairie Island	1.4E-6(1)	37	1.6E-5
	2.4E-4(2)	16	1.0E-3
Haddam Neck	1.2E-6	37	1.4E-5
	2.1E-4	16	8.0E-4
San Onofre	9.0E-7	37	1.1E-5
	1.6E-4	16	6.7E-4
ANO-2	-- (3)	--	--
	4E-5	16	1.6E-4
Ft. Calhoun	--	--	--
	4E-5	16	1.6E-4
ANO-1	9.0E-7	37	9.7E-6
	6.4E-5	16	2.6E-4
Davis-Besse	--	--	--
	1.3E-4	16	5.4E-4
Crystal River	2.8E-6	37	3.1E-5
	2.0E-4	16	8.3E-4
Rancho Seco	8.5E-7	37	9.3E-6
	6.1E-5	16	2.5E-4
Turkey Point	4.0E-8	37	4.5E-7
	6.7E-6	16	2.8E-5

(1) The top values include credit for the feed-and-bleed mode.
(2) The bottom values exclude the feed-and-bleed mode.
(3) We assumed that ANO-2, Davis-Besse, and Ft. Calhoun have no feed-and-bleed capability.

QUESTION 5: TOLEDO EDISON HAS FINALLY DECIDED TO UPGRADE THE AUXILIARY FEEDWATER SYSTEM BY INSTALLING A THIRD DIVERSE DRIVE AUXILIARY FEEDWATER PUMP AT DAVIS-BESSE. PLEASE PROVIDE THE FOLLOWING INFORMATION:

A. WILL THE MODIFICATION CONSTITUTE A NEW TRAIN OF AUXILIARY FEEDWATER OR JUST A NEW PUMP? WHAT OTHER OPTIONS ARE POSSIBLE? PLEASE STATE THE RELATIVE ADVANTAGES AND DISADVANTAGES OF ALL OPTIONS.

ANSWER:

BASED ON THE TOLEDO EDISON PROPOSED DESIGN CHANGE THE STAFF UNDERSTANDS THE MODIFICATION TO CONSIST OF A NEW TRAIN AND NOT JUST A NEW PUMP. THE TRAIN WILL CONSIST OF A 100% CAPACITY PUMP AND THE ASSOCIATED VALVES AND PIPING. THE NEW TRAIN WILL BE INDEPENDENT OF THE EXISTING AFW SYSTEM EXCEPT FOR THE POINT OF INJECTION INTO EITHER OF THE TWO STEAM GENERATORS AND THE SOURCES OF WATER.

REGARDING OTHER POSSIBLE OPTIONS, TWO COME TO MIND AS THEY ARE PRESENTLY USED IN OPERATING PLANTS:

TURBINE DRIVE AND ELECTRIC DRIVE COUPLED TO A COMMON PUMP. THIS DESIGN HAS THE ADVANTAGE OF PROVIDING TWO DIVERSE DRIVES FOR A COMMON PUMP YET A SINGLE FAILURE, A FAILURE OF THE PUMP, WILL RESULT IN THE LOSS OF BOTH DRIVES.

DIRECT DRIVE DIESEL ENGINE COUPLED TO A PUMP. THIS DESIGN HAS THE ADVANTAGE OF PROVIDING A DRIVE WHICH IS INDEPENDENT OF AC POWER OR STEAM DRIVE. IT, HOWEVER, HAS THE DISADVANTAGES ASSOCIATED WITH DIESEL ENGINES.

QUESTION 5: B. HOW WILL THE NEW PUMP FEED WATER TO THE STEAM GENERATORS AND WILL IT BE FITTED WITH VALVES AND PIPING TO PROVIDE WATER IN MORE THAN ONE MANNER?

ANSWER:

THE NEW SUFP WILL BE CAPABLE OF FEEDING WATER TO EITHER STEAM GENERATOR THROUGH THE MAIN FEEDWATER LINES OR THROUGH THE AUXILIARY FEEDWATER LINES. THE SELECTION OF THE FEEDPOINT IS BY MEANS OF VALVES PROVIDED WITH THIS TRAIN.

Question 5: c. Will the new system and pump be safety grade?

Answer:

No. Only the portion of the new system which connects to safety-related systems will be safety grade up to the first isolation valve. The existing steam driven AFWS is safety grade. It is not necessary for safety or to achieve the desired increase in reliability to require the third backup train of AFWS to also be safety grade.

QUESTION 5: D. WILL THE NEW SYSTEM BE DESIGNED TO FUNCTION DURING A LOSS OF OFFSITE POWER EVENT AND IF SO, HOW?

ANSWER:

YES. THE NEW SUFP WILL BE CAPABLE OF BEING MANUALLY LOADED ONTO EITHER DIESEL GENERATOR IN THE EVENT OF A LOSS OF OFFSITE POWER. THIS IMPROVES RELIABILITY BECAUSE THE OPERATOR CAN SELECT THE DIESEL THAT IS FUNCTIONING IN THE EVENT THAT ONE DIESEL GENERATOR FAILS FOLLOWING A LOSS OF OFFSITE POWER.

QUESTION 5: E. WILL THE NEW SYSTEM BE AUTOMATIC OR MANUALLY INITIATED?

ANSWER:

THE NEW SUFP WILL BE MANUALLY INITIATED FROM THE CONTROL ROOM. THE STAFF DURING ITS REVIEW OF THE NEW SUFP WILL DETERMINE THE NEED FOR AUTOMATIC INITIATION.

QUESTION 6. During the subcommittee's June 21, 1985 briefing, Harold Denton, Director of the Office of Nuclear Reactor Regulation, stated that the performance of the feedwater systems at Davis-Besse was worse than that projected by probabilistic risk assessment (PRA). What is the reason for this discrepancy and what generic implications does this have for the degree of confidence ascribed to PRA?

ANSWER.

Mr. Denton's comments referred to studies which indicated that the frequency of a loss of main feedwater was approximately once per plant-year and the unreliability of the auxiliary feedwater system was in the range of 10^{-3} to 10^{-5} per demand. The fact is that the recent performance of the feedwater system at Davis-Besse was inconsistent with what was expected. Davis-Besse had experienced three temporary loss of main feedwater events during the first six months of 1985 which when combined with the multiple common mode failures of the auxiliary feedwater system on June 9, 1985 appeared to be inconsistent with a 10^{-3} to 10^{-5} unreliability.

The NRC has received two plant-specific reliability analyses of the Davis-Besse Auxilairy feedwater system, the most recent done by EDS for Toledo Edison and submitted to the NRC in December 1981. None of these analysis cover many of the other systems or components involved in the incident of June 9. In addition, these analyses did not include a detailed examination of potential common-cause failures nor a review of the steam and feedwater rupture control system. Also, it is not unusual for operating experience to highlight new potential weaknesses in design and operation. It should also be recognized that the startup feedwater system functioned and that the primary auxiliary feedwater system was restored within an acceptable time frame to provide adequate decay heat removal. Recovery actions by the operators may also be part of PRA methodology.

This event does not have generic implications on the degree of confidence ascribed to PRA. PRA provides a logical framework for systematically evaluating the design and performance of a system or plant. It has acknowledged uncertainties associated with modelling, quantification, and omissions. Like any other evaluation process, the results are related to the scope and depth of the analysis. PRA provides a cohesive structure for assembling and assessing the information.

Commissioner Asselstine adds:

I agree with this answer, except for the Commission's statement that: "This event does not have generic implications on the degree of confidence ascribed to PRA." I believe that Davis Besse is a good test of the extent to which one can have confidence in PRA results. Here is a case where two independent reliability analyses were performed on the same system. The results differed by a factor of 100 on the reliability of the system, not taking into account the uncertainties. Further, Mr. Denton recently wrote to the EDO: "I believe that the recent Davis Besse event illustrates that, in the real world, system and component reliabilities can degrade below those we and the industry routinely assume in estimating core melt frequencies." (See attached letter from Harold R. Denton to William J. Dircks, dated June 27, 1985).

There is another potentially revealing aspect in the June 9 Davis Besse event. It appears that the steam and feedwater rupture control system had a significant role in causing the loss of auxiliary feedwater. Yet, that system was not even included as a possible contributor to the unreliability of the auxiliary feedwater system in either of the independent reliability analyses. This raises the question of whether PRA's actually identify the weak spots of systems, as their promoters frequently claim the do.

WHILE THE COMMISSION ACKNOWLEDGES THERE ARE UNCERTAINTIES ASSOCIATED WITH PRA'S, IT NOWHERE EXPLAINS HOW TO QUANTIFY THOSE UNCERTAINTIES AND, MORE IMPORTANTLY, THE COMMISSION NOWHERE EXPLAINS HOW TO FACTOR INTO THE DECISIONMAKING PROCESS THOSE UNCERTAINTIES THEY CAN QUANTIFY.

to be on at next mtg.

June 27, 1985

BURDICK
J. HENRY
FILE

Attachment
Question 6

Severe Accidents

MEMORANDUM FOR: William J. Dircks
Executive Director for Operations

FROM: Harold R. Denton, Director
Office of Nuclear Reactor Regulation

SUBJECT: COMMISSION PAPER ON STATION BLACKOUT

In SECY-83-163, "Proposed Station Blackout Rule", we noted that the Nuclear Utility Group on Station Blackout (NUGSBO) was preparing an alternative proposal for resolution of USI A-44. We requested that the Commission not schedule meetings on the proposed rule until we had reviewed the industry submittal and forwarded our evaluation to the Commission.

We have prepared the enclosed Commission Paper for your review and signature. The paper notes that NUGSBO's conclusion that a rule is not warranted is based on: (i) optimistic projections of recent loss-of-offsite power data, (ii) assumed maintenance of high diesel generator reliabilities, and (iii) the assumption that all plants can withstand a two-hour loss of all ac power. Our proposed rule would require licensees to determine that their plants can withstand blackout events of an acceptable duration (not specified in the rule.) The associated proposed Regulatory Guide does present a methodology that would lead to selection of a 4- or 8-hour duration, but allows plant-specific justification of shorter durations. We note in the paper that a blackout capability of only two hours, based on NUGSBO's assumptions, would leave very little margin for potential degradations in grid reliability or diesel generator reliability that may occur, in spite of good-intentioned voluntary industry initiators to maintain and improve them.

I believe that the recent Davis-Besse event illustrates that, in the real world, system and component reliabilities can degrade below those we and the industry routinely assume in estimating core melt frequencies. Our regulatory process should require margins against such degradation and also to reflect the uncertainties in our PRA estimates.

I strongly support the recommendation in the enclosed paper that the Commission proceed with the proposed rulemaking.

OFFICIAL RECORD COPY

The paper also recommends an addition to the Notice of Rulemaking that would reference the NUGSBO proposal, encourage development of more specific information regarding voluntary industry programs to assure reliability of onsite power systems and procedures and training for blackout events, and invite comments on the effects of such programs on the proposed rule and regulatory guide.

We have also enclosed a proposed letter for your signature to NUGSBO consistent with the commission paper.

I recommend your approval of the commission paper.

Original Signed by
H. R. Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Enclosures:
As stated

Distribution
Central File
DST Chron
GIB Rdg
A-44 File
TSpeis
FSchroeder
KKniel
ARubin
HDenton

w/o Encl.
J. Taylor, IE
R. Minogue, RES
C. Heltemes, AEOD

ADGP:DST	D:DST	D:NRR				
FSchroeder/bn	TPSpeis/b	HRDenton				
6/26/85	6/26/85	6/[illegible]/85				

OFFICIAL RECORD COPY

QUESTION 7. AT THE BEGINNING OF THE DAVIS-BESSE INCIDENT ON JUNE 9, 1985, HOW MANY OPERATORS AND WHICH ONES WERE IN THE CONTROL ROOM? DURING THE INCIDENT HOW MANY OPERATORS WERE OUTSIDE THE CONTROL ROOM OR STATIONED POST, WHAT WERE THEIR TITLES, WHY DID THEY LEAVE THE CONTROL ROOM OR STATIONED POST, AND SPECIFICALLY WHAT ACTIONS WERE ACTUALLY ACCOMPLISHED OUTSIDE OF THE CONTROL ROOM. IN LIGHT OF THOSE ACTIONS THAT NEEDED TO BE TAKEN FROM OUTSIDE THE CONTROL ROOM, IS DAVIS-BESSE MEETING GENERAL DESIGN CRITERION 19 WHICH STATES:

> "A CONTROL ROOM SHALL BE PROVIDED FROM WHICH ACTIONS CAN BE TAKEN TO OPERATE THE NUCLEAR POWER UNIT SAFELY UNDER NORMAL CONDITIONS AND TO MAINTAIN IT IN A SAFE CONDITION UNDER ACCIDENT CONDITIONS...."

ANSWER.

THE NRC INVESTIGATION OF THE DAVIS-BESSE LOSS OF FEEDWATER INCIDENT IS ONGOING AT THIS TIME. THEREFORE, WE HAVE NOT COMPLETED OUR EVALUATION OF THE IMPLICATIONS OF OPERATOR ACTIONS REQUIRED OUTSIDE OF THE CONTROL ROOM. WE WILL CONSIDER THIS QUESTION IN THE EVALUATION AND INFORM THE SUBCOMMITTEE OF OUR FINDINGS WITH RESPECT TO THE GENERAL DESIGN CRITERIA.

QUESTION 8 ACCORDING TO THE NRC STAFF, FEED AND BLEED PROCEDURES FOR EMERGENCY COOLING WERE INITIATED DURING THE DAVIS-BESSE INCIDENT. NUMEROUS NRC MEMORANDA STATE THAT FEED AND BLEED EMERGENCY COOLING IS NOT CAPABLE OF AVERTING CORE DAMAGE AT DAVIS-BESSE. WHY THEN ARE FEED AND BLEED PROCEDURES PART OF THE NRC APPROVED EMERGENCY OPERATING PROCEDURES FOR THIS PLANT? IN RESPONDING TO THIS QUESTION, PLEASE STATE WHETHER SUCH A PROCEDURE WOULD LENGTHEN THE TIME BEFORE CORE UNCOVERING AND DAMAGE (AND IF SO BY HOW MUCH) AND WHETHER UNDERTAKING SUCH AN EFFORT IS DESIRABLE GIVEN OTHER PRIORITIES FACING THE OPERATORS.

ANSWER

FEED AND BLEED COOLING IS GENERALLY DEFINED AS USE OF THE HIGH PRESSURE INJECTION (HPI) SYSTEM FOR COOLANT INJECTION WITH THE PRESSURIZER PORV AND/OR CODE SAFETY VALVES (PSV) USED FOR ENERGY REMOVAL FROM THE REACTOR COOLANT SYSTEM. THE FEED AND BLEED COOLING MODE IS A BACKUP MEASURE AVAILABLE TO PLANT OPERATORS FOR COPING WITH EVENTS INVOLVING LOSS OF SECONDARY HEAT REMOVAL CAPABILITY. THIS MODE OF COOLING CAN BE UTILIZED TO KEEP THE CORE COOLED WHILE MEASURES ARE TAKEN TO RESTORE FEEDWATER, AND/OR TO DEPRESSURIZE THE PRIMARY SYSTEM TO A POINT WHERE A LOWER PRESSURE RESIDUAL HEAT REMOVAL (RHR) SYSTEM CAN FUNCTION. BECAUSE DAVIS BESSE HAS NEITHER

SAFETY INJECTION PUMPS (SHUTOFF LEVEL OF ABOUT 1600 PSI) CAPABLE OF INJECTING SUFFICIENT COOLING WATER AT THE SET PRESSURE OF EITHER THE PORV (2425 PSI) OR SAFETY VALVE (2500 PSIA), NOR DOES IT HAVE A PORV RELIEVING CAPACITY CAPABLE OF DEPRESSURIZING THE PRIMARY SYSTEM PRESSURE TO BELOW THE SHUTOFF LEVEL OF THE SAFETY INJECTION PUMPS, IT DOES NOT HAVE A FEED AND BLEED CAPABILITY BASED ON THE ABOVE DEFINITION. THIS HAS BEEN THE BASIS FOR PREVIOUS STAFF STATEMENTS ON THIS ISSUE FOR DAVIS BESSE.

HOWEVER, DAVIS-BESSE DOES HAVE A LIMITED HEAT REMOVAL CAPABILITY UTILIZING CERTAIN COMBINATIONS OF THE HIGH PRESSURE MAKEUP (MU) PUMPS, THE PORV, AND THE STARTUP FEEDWATER PUMP. FOR EXAMPLE, SIMPLIFIED MASS AND ENERGY CALCULATIONS HAVE BEEN PERFORMED BY THE STAFF WHICH INDICATE THAT, IF FEEDWATER WAS NOT RESTORED DURING THE DAVIS-BESSE EVENT, THE CORE MIGHT NOT EXPERIENCE FUEL DAMAGE IF BOTH MAKEUP PUMPS HAD BEEN STARTED. HOWEVER, WHILE THESE SIMPLIFIED CALCULATIONS ARE NOT SUFFICIENTLY ACCURATE TO FULLY DEMONSTRATE THAT CONTINUED CORE COOLING WOULD HAVE BEEN MAINTAINED, THEY ARE SUFFICIENT TO CONCLUDE THAT THE LIMITED MAKEUP PUMP FLOW WOULD AT LEAST SUBSTANTIALLY EXTEND THE TIME BEFORE CORE DAMAGE OCCURS, OR PREVENT IT ALTOGETHER.

STAFF CALCULATIONS HAVE ALSO BEEN PERFORMED WHICH EXAMINE THE USE OF THE MAKEUP PUMPS IN A FEED AND BLEED MODE THROUGH THE PRESSURIZER CODE SAFETY VALVES ASSUMING INITIAL PLANT OPERATION AT 100% POWER. THESE CALCULATIONS INDICATE THAT IF THE FEED AND BLEED MODE IS INITIATED IN APPROXIMATELY FIVE (5) MINUTES, UNCOVERY OF THE TOP OF THE CORE MIGHT NOT OCCUR. HOWEVER, IF INITIATED TWENTY (20) MINUTES INTO A LOSS OF ALL FEEDWATER EVENT, THE CORE WOULD START TO UNCOVER IN APPROXIMATELY 150 MINUTES IF FEEDWATER IS NOT RESTORED. THIS IS IN CONTRAST TO A CORE UNCOVERY IN APPROXIMATELY 55 MINUTES IF NO ACTION TO START THE MAKEUP PUMPS IS TAKEN.

AS PART OF THE ABNORMAL TRANSIENT OPERATOR GUIDELINES (ATOG) SUBMITTAL, DEVELOPED IN RESPONSE TO ITEM I.C.1 OF NUREG-0737, THE LICENSEE HAS EXAMINED THE CAPABILITY OF FEED AND BLEED COOLING TO MITIGATE A LOSS OF ALL FEEDWATER EVENT. THESE ANALYSES CONCLUDED THAT IF THE OPERATOR STARTS BOTH MU PUMPS AND OPENS THE PORV IN APPROXIMATELY FIVE (5) MINUTES, THE REACTOR COOLANT SYSTEM WOULD DEPRESSURIZE, SUFFICIENT FOR THE HPI SYSTEM TO INJECT COOLANT INTO THE PRIMARY SYSTEM AND THE CORE WOULD REMAIN COVERED AND ADEQUATELY COOLED. IN ADDITION, ANALYSES HAVE BEEN PROVIDED BY TOLEDO EDISON COMPANY, THE OWNERS OF THE DAVIS BESSE PLANT, WHICH SHOW THAT BY STARTING ONE MU PUMP, OPENING THE PORV AND INITIATING THE STARTUP FEEDWATER PUMP WITHIN 30 MINUTES, THE CORE WOULD REMAIN COVERED AND WOULD BE ADEQUATELY COOLED.

GENERIC GUIDELINES HAVE BEEN DEVELOPED BASED ON THE ANALYSES DESCRIBED ABOVE. PERMISSION TO IMPLEMENT PROCEDURES WHICH CALL FOR THE OPERATOR TO INITIATE VARIOUS OPTIONS FOR EMERGENCY COOLING OF THE REACTOR CORE WAS INDICATED IN NUREG-0737, ITEM I.C.1. AND THE SER ON THE B&W ATOG PROGRAM. STAFF REVIEW OF THE DAVIS-BESSE PROGRAM FOR GENERATING PLANT-SPECIFIC PROCEDURES FOR THIS AND OTHER EVENTS BASED ON ATOG IS ONGOING.

FINALLY, YOU EXPRESSED A CONCERN AS TO WHETHER UNDERTAKING SUCH AN EFFORT IS DESIRABLE GIVEN OTHER PRIORITIES FACING THE OPERATORS. THE FIRST ACTIONS FOR THE OPERATOR UPON RECOGNITION OF THE LOSS OF ALL FEEDWATER IS TO ACTUATE THE MU AND HPI PUMPS AND OPEN THE PORV. THESE ACTIONS CAN BE PERFORMED READILY FROM THE CONTROL ROOM. THE OPERATOR IS THEN DIRECTED TO RESTORE FEEDWATER TO THE STEAM GENERATORS UTILIZING EITHER THE AUXILIARY FEEDWATER SYSTEMS, THE MAIN FEEDWATER SYSTEM OR THE STARTUP FEEDWATER PUMP. THE STAFF HAS CONCLUDED THAT THIS APPROACH IS PRUDENT, AND DOES NOT PLACE AN UNDUE BURDEN ON THE OPERATORS BECAUSE THE FEED AND BLEED COOLING MODE USING MAKEUP PUMPS AND OPENING THE PORV IS SIMPLE TO INITIATE. IMPLEMENTATION OF THESE ACTIONS WILL PROVIDE A LONGER TIME PERIOD FOR FEEDWATER RECOVERY, INCLUDING POTENTIAL USE OF THE STARTUP FEEDWATER PUMP, BEFORE CORE UNCOVERY WOULD OCCUR, AND MAY ALSO PREVENT SIGNIFICANT CORE DAMAGE IF FEEDWATER IS NEVER RECOVERED.

QUESTION 9 GIVEN THE DEMONSTRATED LIKELIHOOD OF A TOTAL LOSS OF FEEDWATER AT B&W REACTORS, WHY DOES THE NRC CONSIDER THIS TYPE OF INCIDENT TO BE BEYOND THE DESIGN BASIS? WHAT IS THE TECHNICAL BASIS FOR CONSIDERING A POTENTIAL FAILURE OR ACCIDENT SEQUENCE AS A DESIGN BASIS EVENT?

ANSWER

THE TECHNICAL BASIS FOR CONSIDERING A POTENTIAL FAILURE OR ACCIDENT SEQUENCE AS A DESIGN BASIS EVENT IS MULTIFACETED AND TAKES INTO ACCOUNT BOTH DETERMINISTIC AS WELL AS PROBABILISTIC CONSIDERATIONS.

DESIGN BASIS EVENTS ARE DEVELOPED BY EXAMINING FAILURES THAT CAN OCCUR DURING PLANT OPERATION. THE EXAMINATION OF THE POTENTIAL FAILURES ALLOWS THE FAILURES TO BE CATEGORIZED BY EVENT TYPE AND ESTIMATED FREQUENCY OF OCCURRENCE. EVENT TYPES INCLUDE UNDERCOOLING EVENTS, OVERCOOLING EVENTS, REACTIVITY INSERTION EVENTS, AND LOSS-OF-COOLANT EVENTS. EVENTS WHICH ARE CONSIDERED TO HAVE A FREQUENCY OF OCCURRENCE OF AT LEAST ONCE IN THE PLANT LIFETIME ARE CATEGORIZED AS "ANTICIPATED OPERATIONAL OCCURRENCES," WHEREAS EVENTS WHICH ARE NOT EXPECTED TO OCCUR DURING THE PLANT LIFETIME, BUT NEVERTHELESS ARE NOT CONSIDERED IMPROBABLE ENOUGH TO OMIT FROM THE DESIGN BASIS, ARE CATEGORIZED AS "POSTULATED ACCIDENTS."

A COMMON CHARACTERISTIC OF BOTH ANTICIPATED OPERATIONAL OCCURRENCES AND POSTULATED ACCIDENTS IS THAT THEY ARE ASSUMED TO BE CAUSED BY A SINGLE MALFUNCTION AS THE INITIATING EVENT. FOR POSTULATED ACCIDENTS, THE STAFF ALSO REQUIRES THAT THE PLANT BE ABLE TO ACCOMMODATE THE WORST SINGLE ACTIVE FAILURE IN CONJUNCTION WITH THE INITIATING EVENT, AND THAT OFFSITE POWER MUST BE ASSUMED LOST PER THE REQUIREMENT OF GENERAL DESIGN CRITERION 17, CONTAINED IN APPENDIX A TO 10CFR50. THE WORST SINGLE ACTIVE FAILURE ASSUMPTION IS A DETERMINISTIC REQUIREMENT NOT DIRECTLY RELATED TO PROBABILISTIC CONSIDERATIONS. MOREOVER, THE FAILURE ASSUMED IS LIMITED TO SYSTEMS AND EQUIPMENT THAT ARE PREDICTED OR ASSUMED TO OPERATE DURING THE EVENT. SPURIOUS OR RANDOM FAILURES ARE NOT POSTULATED.

IN THE CASE OF DAVIS-BESSE, THE PLANT WAS DESIGNED FOR A LOSS-OF-MAIN FEEDWATER AS THE INITIATING EVENT, AND THE SINGLE FAILURE ASSUMPTION REQUIRED POSTULATION OF ONE AUXILIARY FEEDWATER PUMP FAILING TO START. THUS, THIS EVENT WOULD DETERMINE THE DESIGN BASIS FOR THE AUXILIARY FEEDWATER PUMP CAPACITY; NAMELY, THAT ONE AUXILIARY FEEDWATER PUMP BE CAPABLE OF SUPPLYING SUFFICIENT WATER TO REMOVE ALL SHUTDOWN DECAY HEAT.

MULTIPLE FAILURES ARE NOT CONSIDERED BECAUSE OTHER NRC DESIGN CRITERIA REQUIRE THAT SYSTEMS BE DESIGNED WITH SUFFICIENT RELIABILITY THAT MULTIPLE FAILURES ARE OF SUFFICIENTLY LOW PROBABILITY THAT THEY NEED NOT BE CONSIDERED IN THE DESIGN BASE. THUS, IF MULTIPLE MALFUNCTIONS ARE UNCOVERED THAT CAN BE EXPECTED TO OCCUR DURING INITIATING EVENTS, AND LEAD TO A LOSS OF A SAFETY FUNCTION AND UNACCEPTABLE CONSEQUENCES, THE NRC POSITION IS TO REQUIRE THAT THE SYSTEM DESIGN BE UPGRADED AND CORRECTED AS NECESSARY SUCH THAT THE MULTIPLE FAILURES CANNOT OCCUR.

THE CAUSES CONTRIBUTING TO THE LOSS OF ALL AUXILIARY FEEDWATER ARE BEING REVIEWED BY THE NRC FACT FINDING TEAM. THEREFORE, IT IS CURRENTLY PREMATURE TO DETERMINE THE EXACT NATURE OF THE CORRECTIVE ACTION THAT MAY BE TAKEN TO ENSURE THAT THE DESIGN BASIS REMAINS ACCEPTABLE.

COMMISSIONER ASSELSTINE ADDS:
THE THRUST OF THIS QUESTION IS: DO THE NRC REGULATIONS MAKE SENSE? I THINK NOT. THE REGULATIONS HAVE BEEN DEVELOPED BASED ON MANY IMPLICIT AND EXPLICIT ASSUMPTIONS AND ARE KNOWN TO BE INCOMPLETE. IN FACT, 10 CFR PART 50, APPENDIX A - GENERAL DESIGN CRITERIA FOR NUCLEAR POWER PLANTS, WHICH WAS PROMULGATED ON FEBRUARY 20, 1971, STATES:

> "THE DEVELOPMENT OF THESE GENERAL DESIGN CRITERIA IS NOT YET COMPLETE. FOR EXAMPLE, SOME OF THE DEFINITIONS NEED FURTHER AMPLIFICATION. ALSO, SOME OF THE SPECIFIC DESIGN REQUIREMENTS FOR STRUCTURES, SYSTEMS, AND COMPONENTS IMPORTANT TO SAFETY HAVE NOT AS YET BEEN SUITABLY DEFINED."

THE COMMISSION HAS YET TO COME TO GRIPS WITH IMPORTANT ISSUES SUCH AS SINGLE FAILURES OF PASSIVE COMPONENTS, AND THE MINIMUM ACCEPTABLE REDUNDANCY AND DIVERSITY OF SUBSYSTEMS AND THE REQUIRED INDEPENDENCE OF THE SUBSYSTEMS. RATHER, IT HAS ASSUMED THAT IT HAS DEVELOPED THE NECESSARY AND SUFFICIENT DESIGN BASIS EVENTS AND ACCIDENTS TO BRACKET ALL CREDIBLE SCENARIOS. I BELIEVE THAT THE JUNE 9, 1985 EVENT AT DAVIS BESSE, THE TMI-2 ACCIDENT, AS WELL AS OTHER OPERATIONAL OCCURRENCES, DRAW INTO QUESTION CONTINUED RELIANCE ON THE REGULATORY APPROACH DESCRIBED BY THE COMMISSION ABOVE. I WOULD ALSO POINT OUT THAT THE AGENCY COMMITTED TO A REEXAMINATION OF THE SINGLE FAILURE CRITERION AFTER THE TMI-2 ACCIDENT BUT LITTLE PROGRESS HAS BEEN MADE.

QUESTION 10. LIST EVERY REGULATION, REQUIREMENT, RECOMMENDATION, GENERAL DESIGN CRITERIA, STANDARD REVIEW PLAN ITEM, BRANCH TECHNICAL POSITION, CONFIRMATORY ACTION LETTER ITEM, LICENSING COMMITMENT, TMI ACTION PLAN ITEM, NUREG-0667 RECOMMENDATION, OR ANY OTHER ITEM THAT DAVIS-BESSE WAS NOT IN FULL AND COMPLETE COMPLIANCE WITH ON JUNE 9, 1985.

ANSWER

THE LISTING IN THIS QUESTION COVERS BOTH REQUIREMENTS AND NON-REQUIREMENTS WHICH ARE SEPARATELY DISCUSSED BELOW. OUR ANSWER TO THIS QUESTION IS BASED ON A BRIEF REVIEW OF THE DOCKET INCLUDING INSPECTION RECORDS AS OF JUNE 9, 1985. SINCE OUR INVESTIGATION OF THE JUNE 9, 1985 INCIDENT OF DAVIS-BESSE IS NOT COMPLETE, WE NOTE THAT OTHER ITEMS MAY BE ADDED WHEN THE INVESTIGATION IS CONCLUDED. IT SHOULD BE ALSO NOTED THAT THERE ARE A NUMBER OF OPEN AND ONGOING INSPECTION ISSUES THAT HAVE NOT BEEN CLOSED OUT. IT IS POSSIBLE THAT ITEMS OF NONCOMPLIANCE MAY BE IDENTIFIED IN SUBSEQUENT FOLLOW-UP.

1. REGULATION - THE SAFETY EVALUATION REPORT (SER) ISSUED AT THE TIME THE OPERATING LICENSE WAS GRANTED MADE SPECIFIC FINDINGS THAT THE REGULATIONS WERE SATISIFED. AT THAT TIME, ONE EXEMPTION TO THE REGULATIONS WAS GRANTED. A SUBSEQUENT REVISION TO APPENDIX J ELIMINATED THE NEED FOR THIS EXEMPTION. SINCE THAT TIME EACH NEW REGULATION ENACTED HAS BEEN SPECIFICALLY BACKFITTED TO DAVIS-BESSE, E.G., APPENDIX R ON FIRE PROTECTION. THREE EXEMPTIONS FOR NEW REGULATIONS

IN JULY 1983, AN AUDIT/INSPECTION WAS CONDUCTED AT THE DAVIS-BESSE FACILITY TO DETERMINE COMPLIANCE TO APPENDIX R TO 10 CFR 50.48 (FIRE PROTECTION). NUMEROUS AREAS OF NON-COMPLIANCE WERE REVEALED BY THE INSPECTION. THE LICENSE HAS SCHEDULED CORRECTIVE ACTIONS TO BRING THE FACILITY INTO COMPLIANCE BY 1989.

2. REQUIREMENT - A REQUIREMENT MUST DERIVE FROM A SPECIFIC BINDING ITEM SUCH AS A REGULATION, ORDER OR, LICENSE CONDITION. THE DAVIS-BESSE PLANT WAS NOT IN COMPLIANCE ONLY WITH THE ITEMS DISCUSSED ABOVE IN REGULATIONS AS OF JUNE 9, 1985.

3. RECOMMENDATION - AN APPLICANT OR LICENSEE IS NOT REQUIRED TO BE IN COMPLIANCE WITH A RECOMMENDATION. THE NRC DOES NOT MONITOR RESULTS OF ALL RECOMMENDATIONS MADE TO A LICENSEE. IF THE MATTER HAS SUFFICIENT WEIGHT TO DEMAND COMPLIANCE THEN IT MUST BE COMMUNICATED IN A BINDING WAY TO BECOME A REQUIREMENT.

4. GENERAL DESIGN CRITERIA - THE GENERAL DESIGN CRITERIA ARE IN THE REGULATIONS AND CONSIDERED PART OF THEM; THE REMARKS ABOVE ON REGULATIONS APPLY.

5. STANDARD REVIEW PLAN - THE STANDARD REVIEW PLAN (SRP) HAS THE FORCE OF A REGULATORY GUIDE, NOT THE FORCE OF REGULATION. APPLICANTS FOR LICENSES CAN SATISFY THE STAFF'S CURRENT INTERPRETATION OF THE REQUIREMENTS OF THE REGULATIONS BY THE MEANS DESCRIBED IN THE SRP. ALTERNATIVES TO THE SRP

ARE EVALUATED IN THE SER TO PROVIDE A BASIS FOR DETERMINING THE ACCEPTABILITY OF THE ALTERNATIVE. THUS, A REQUIREMENT MAY BE SATISFIED WITHOUT CONFORMING WITH THE SRP. THE DAVIS-BESSE PLANT OPERATING LICENSE REVIEW WAS NOT REQUIRED TO BE EVALUATED USING SRP CRITERIA BECAUSE THE REVIEW WAS STARTED SEVERAL YEARS BEFORE SRP WAS ISSUED. A COMPLETE LISTING OF THESE NON-CONFORMANCES WITH THE SRP WOULD BE TIME-CONSUMING AND DIFFICULT TO GENERATE SINCE IT WOULD REQUIRE A REVIEW OF ALL SERS ON DAVIS-BESSE AND A CONSISTENT DETERMINATION OF WHAT IS NON-CONFORMING WITH THE SRP. NORMALLY THE SRP IS USED AS A GAUGE OF ACCEPTABILITY WHEN THE NRC IS CONSIDERING AN UPGRADING OF REQUIREMENTS E.G., ITEM II.E.1.1 OF NUREG-0737.

6. BRANCH TECHNICAL POSITION - THE BRANCH TECHNICAL POSITIONS ARE ONE STEP LESS FORMAL THAN AN EQUIVALENT ELEMENT OF THE SRP, AND THE REMARKS ABOVE ON SRP ITEMS APPLY.

7. CONFIRMATORY ACTION LETTER (CAL) - THERE IS ONLY ONE CAL, REGARDING SNUBBERS AND PIPE RESTRAINTS, THAT WAS ACTIVE FOR THE DAVIS-BESSE PLANT ON JUNE 9, 1985. THERE WERE NO ITEMS IN THE CAL FOR WHICH THE DAVIS-BESSE PLANT WAS NOT IN COMPLIANCE ON JUNE 9, 1985.

8. LICENSING COMMITMENT - AS OF JUNE 9, 1985, TO THE BEST OF OUR KNOWLEDGE, THE LICENSEE WAS IN COMPLIANCE WITH ALL LICENSING COMMITMENTS.

9. TMI ACTION PLAN ITEM - THE TMI ACTION PLAN ITEMS WERE HANDLED AS NRC REQUIREMENTS FOR WHICH CONFIRMATORY ORDERS WERE ISSUED REGARDING THE LICENSEE'S SCHEDULAR COMMITMENTS. THE LICENSEE IS IN COMPLIANCE WITH THESE ORDERS. "ALTHOUGH SOME TMI ACTION ITEMS HAVE NOT BEEN COMPLETED, ALL REVIEWS ARE PROCEEDING ON SCHEDULE WHICH IS ACCEPTABLE TO THE STAFF."

10. NUREG-0667 RECOMMENDATION - THE REMARKS ON RECOMMENDATION (NUMBER 3) APPLY HERE ALSO. THE STATUS OF NUREG-0667 RECOMMENDATIONS IS DISCUSSED IN THE ANSWER TO QUESTION 14, WHICH LISTS THE RECOMMENDATIONS THAT HAVE BEEN MADE NRC REQUIREMENTS. THERE ARE NO NRC REQUIREMENTS STEMMING FROM THE NUREG-0667 RECOMMENDATIONS FOR WHICH THE DAVIS-BESSE WAS NOT IN COMPLIANCE ON JUNE 9, 1985.

TABLE Q-10

OUTSTANDING EXEMPTIONS FROM 10 CFR

REGULATION	SUBJECT, DATE GRANTED
10 CFR 50 APPENDIX R	TECHNICAL EXEMPTION TO APPENDIX R, SECTION III.G, NOVEMBER 23, 1982
10 CFR 50 § 50.44(c)(3)(iii)	SCHEDULAR EXEMPTION TO FIRST REFUELING OUTAGE AFTER 1985 FOR VESSEL HEAD VENT, SEPTEMBER 7, 1983
10 CFR 50	TECHNICAL EXEMPTIONS TO APPENDIX R SECTIONS III.G, III.O, AND III.L, AUGUST 20, 1984

QUESTION 11. ACCORDING TO A JUNE 19, 1985 MEMORANDUM FROM C. J. HELTEMES JR., DIRECTOR OF THE OFFICE OF ANALYSIS AND EVALUATION OF OPERATIONAL DATA, TO WILLIAM J. DIRCKS, EXECUTIVE DIRECTOR FOR OPERATIONS, THE SAFETY PARAMETER DISPLAY SYSTEM (SPDS) WAS INOPERABLE AT TIME OF THE DAVIS-BESSE INCIDENT. THE SPDS SYSTEM WAS TO BE INSTALLED AT DAVIS-BESSE IN ACCORDANCE WITH THE TMI ACTION PLAN IN ORDER TO PROVIDE REACTOR OPERATORS WITH MINIMUM INFORMATION WHICH DEFINES THE SAFETY PARAMETERS OF THE PLANT. PLEASE STATE:

(A) WHEN THIS SYSTEM WAS TO HAVE BEEN OPERATIONAL ACCORDING TO THE TMI ACTION PLAN;

ANSWER

THE RELEVANT ACTION PLAN GUIDANCE IS ITEM I.D.2, SAFETY PARAMETER DISPLAY SYSTEM, DESCRIBED IN NUREG 0737, SUPPLEMENT 1, CLARIFICATION OF TMI ACTION PLAN REQUIREMENTS. THIS ITEM WAS NOT GIVEN A SINGLE, GENERIC DUE DATE. THE PLANT SPECIFIC DUE DATE FOR DAVIS BESSE WAS NOVEMBER 30, 1984 AS DOCUMENTED IN AN NRC CONFIRMATORY ORDER DATED FEBRUARY 21, 1984.

MARKEY/IE
7/8/85

QUESTION 11. (B) WHEN IT BECAME OPERATIONAL AT DAVIS BESSE;

ANSWER.

AT DAVIS BESSE, THE PLANT WAS IN A SHUTDOWN STATUS ON NOVEMBER 30, 1984. THE SAFETY PARAMETER DISPLAY SYSTEM WAS MADE OPERABLE BY THE TIME OF THE NEXT STARTUP ON JANUARY 1, 1985. THE NRC STAFF HAD PREVIOUSLY ACCEPTED THIS CHANGE IN SCHEDULE AS DOCUMENTED IN AN NRC LETTER TO THE LICENSEE ON JUNE 5, 1984.

MARKEY/IE
7/8/85

QUESTION 11. (C) WHY THIS SYSTEM WAS INOPERABLE DURING THE DAVIS BESSE INCIDENT; AND

ANSWER.

AT DAVIS BESSE THERE ARE TWO COMPUTERS CAPABLE OF OPERATING THE SAFETY PARAMETER DISPLAY SYSTEM. ONE COMPUTER HAD BEEN UNABLE TO OPERATE THE SPDS FOR SOME TIME DUE TO INTERMITTENT NOISE PROBLEMS. THE SECOND COMPUTER BECAME UNABLE TO OPERATE THE SPDS AT 3:30 P.M. ON JUNE 8, 1985 DUE TO FAILURE OF A CABINET COOLING FAN AND/OR NOISE PROBLEMS. THE SYSTEM REMAINED IN THIS STATUS UNTIL THE TIME OF THE INCIDENT ON JUNE 9, 1985. (IT SHOULD BE NOTED THAT THE SPDS IS CONSIDERED TO BE AN AID TO OPERATORS IN ACCIDENT ASSESSMENT, AND THERE IS NO TECHNICAL SPECIFICATION REQUIREMENT THAT SPDS BE AVAILABLE IN ORDER TO CONTINUE PLANT OPERATION. OTHER SAFETY GRADE INSTRUMENTS ARE REQUIRED TO BE AVAILABLE. FURTHER, PROCEDURES TO DIAGNOSE CONDITIONS ARE REQUIRED, INCLUDING PROCEDURES THAT DO NOT REQUIRE INFORMATION FROM THE SPDS.)

MARKEY/IE
REVISED 7/16/85

QUESTION 11. (D) WILL IT BE OPERABLE PRIOR TO RESTART?

ANSWER.

THE SYSTEM HAS BEEN MADE OPERABLE WITH ONE COMPUTER. THE COOLING FAN HAS BEEN REPLACED BUT THE SOURCE OF NOISE HAS NOT BEEN IDENTIFIED. THE NRC WILL PURSUE RELIABILITY IMPROVEMENT OF THE SYSTEM PRIOR TO STARTUP. ACCORDINGLY, THE SYSTEM WILL LIKELY BE OPERABLE AT THE TIME OF RESTART. HOWEVER, AS NOTED IN THE RESPONSE TO 11C, THERE IS NO REQUIREMENT THAT THE SPDS BE OPERABLE IN ORDER TO START UP THE PLANT.

MARKEY/IE
REVISED 7/16/85

QUESTION 12: LIST SEPARATELY THOSE PLANTS THAT DO NOT HAVE AUXILIARY FEEDWATER SYSTEMS THAT ARE FULLY SAFETY GRADE, THOSE THAT HAVE ONLY TWO AUXILIARY FEEDWATER PUMPS AND THOSE THAT HAVE AUXILIARY FEEDWATER PUMPS POWERED ONLY BY ONE SOURCE.

ANSWER:

THE ANSWER WE ARE PROVIDING TO THIS QUESTION IS LIMITED TO B&W DESIGNED PLANTS BECAUSE OF THE TIME AVAILABLE TO RESPOND; HOWEVER, THE QUESTION COULD BE APPLIED TO OTHER VENDOR DESIGNS. THE B&W OPERATING PLANTS WERE DESIGNED PRIOR TO THE ISSUANCE OF THE STANDARD REVIEW PLAN (1975). PRIOR TO THAT TIME, THE AUXILIARY FEEDWATER SYSTEMS (AFWS) WERE NOT DESIGNED TO SAFETY GRADE STANDARDS BUT RATHER WERE TO GOOD ENGINEERING PRACTICE. THE AFWS WAS NOT CONSIDERED A PART OF THE NSSS SYSTEM AND, THEREFORE, WAS NOT SUPPLIED BY THE NSSS VENDOR BUT WAS SUPPLIED BY THE UTILITY. SUBSEQUENT TO THE ACCIDENT AT TMI-2, THE B&W PLANTS WERE SHUT DOWN AND CERTAIN MODIFICATIONS WERE MADE PRIOR TO THEIR RESTART. SINCE THE RESTARTS, THE STAFF HAS CONTINUED WORKING WITH THE LICENSEES TO UPGRADE THEIR AFWS BASED ON THE REQUIREMENTS DESCRIBED IN THE TMI ACTION PLAN NUREG-0737 ITEMS II.E.1.1 AND II.E.1.2. THE STATUS OF THE B&W PLANTS REGARDING CURRENT AFWS CRITERIA IS PROVIDED IN TABLE 1. THE ONLY OPERATING B&W PLANT THAT HAS AN AUXILIARY feedwater system considered safety grade is Davis-Besse. Four B&W plants have made commitments to implement improvements to the AFW systems based on reviews using the Standard Review Plan criteria. The three Oconee units AFW systems are still under staff review regarding their seismic design capability. The list of those B&W plants that have only 2 AFWS pumps and those that have AFWS pumps powered by only one source is provided in Tables 2 and 3, respectively.

Commissioner Asselstine adds:
I find it very disquieting that the technical staff characterizes in Table 1 the TMI-1 emergency feedwater system as one of "low" reliability, based on a plant-specific analysis. Given that feed and bleed capability has not been demonstrated at TMI-1, I must now question the adequacy of the design of the TMI-1 emergency feedwater system.

TABLE 1

AUXILIARY FEEDWATER SYSTEM

Operating Plants	SRP 10.49 Compliance	MPA C-14 Compliance	NUREG-0737 TAP-II.E.1.1 Compliance	NUREG-0737 TAP-II.E.1.2 Compliance	Reliability Criterion Compliance
Arkansas-1	Committed to upgrade system for seismic capability & tornado missile protection.	Committed to upgrade system for compliance.	Yes	Yes	Low (Unavailability $>10^{-3}$); Proposed new design will raise it to medium (Unavail.: 10^{-3}-10^{-4}).
Crystal River-3	Committed to upgrade system for tornado missile, int. generated missile, single failure vulnerability & auto. initiation & control.	Committed to upgrade system for compliance.	Yes	Yes	Medium (Unavailability: 10^{-3} - 10^{-4}).
Davis Besse-1	Committed to upgrade system for improved reliability & power diversity.	System meets the intent.	Yes But see response to questions 2 & 5.	Yes	Low (Unavailability $>10^{-3}$).
Oconee 1, 2, & 3	Seismic capability & tornado missile protection for the system not demonstrated.	Seismic capability not demonstrated.	Yes	Yes	Medium (Unavailability: 10^{-3} - 10^{-4}).

376

TABLE 1

AUXILIARY FEEDWATER SYSTEM (Cont'd.)

Operating Plants	SRP 10.49 Compliance	MPA C-14 Compliance	NUREG-0737 TAP-II.E.1.1 Compliance	NUREG-0737 TAP-II.E.1.2 Compliance	Reliability Criterion Compliance
Rancho Seco	Committed to upgrade auto. initiation as a safety grade system.	System meets the intent.	Compliance complete by June 1986	Yes	Medium (Unavailability: 10^{-3} - 10^{-4}).
TMI-1	Committed to upgrade auto. initiation as a safety grade system at refueling after restart.	System meets the intent. Add'l. seismic upgrade committed at refueling after restart.	Short term modifications completed. Long term modifications to be completed at refueling after restart.	Short term modifications completed. Long term modifications to be completed at refueling after restart.	Low (Unavailability $>10^{-3}$). (This reliability is based upon a plant specific analysis) After upgrades reliability will be medium.

Attachment Question 12

Attachment Question 12

TABLE 2

B&W PLANTS WITH TWO AFW PUMPS

Operating Plant	Pump Data			Remarks
	No. of Pumps	Type of Drive		
		Steam	Electric	
Arkansas-1	2	1	1	
Crystal River-3	2	1	1	
Davis Besse-1	2	2	-	Committed to install 3rd motor driven pump
Rancho Seco	2	* 1	1	* Dual drive: steam & motor

TABLE 3

B&W PLANT(S) WITH AFW PUMPS POWERED BY ONE SOURCE

Operating Plant	No. of Pumps	Type of Drive	Remarks
Davis Besse-1	2	Steam	Committed to install third motor driven pump

QUESTION 13. WHAT, IF ANY, PLANTS ARE NOT IN FULL COMPLIANCE WITH THE TMI ACTION PLAN ITEMS RELATING TO AUXILIARY FEEDWATER SYSTEMS?

ANSWER.

THE ANSWER WE ARE PROVIDING TO THIS QUESTION IS LIMITED TO B&W DESIGNED PLANTS. FIRST, THE SPECIFIC REQUIREMENTS ARE LISTED. THEN THE IMPLEMENTATION STATUS IS DISCUSSED.

THE RELEVANT ACTION PLAN ITEMS ARE ITEM II.E.1.1, AUXILIARY FEEDWATER SYSTEM EVALUATION, AND ITEM II.E.1.2, AUXILIARY FEEDWATER SYSTEM AUTOMATIC INITIATION AND FLOW INDICATION, AS DESCRIBED IN NUREG 0737, CLARIFICATION OF TMI ACTION PLAN REQUIREMENTS. THESE ITEMS ARE BRIEFLY SUMMARIZED BELOW.

II.E.1.1 AUXILIARY FEEDWATER SYSTEM EVALUATION

PROVIDE EVALUATIONS FOR NRC STAFF REVIEW AND IMPLEMENT SHORT-TERM AND LONG-TERM MODIFICATIONS DETERMINED TO BE NECESSARY.

MARKEY/IE
7/12/85

II.E.1.2 AUXILIARY FEEDWATER SYSTEM AUTOMATIC INITIATION AND FLOW INDICATION.

1. INITIATION

A. IMPLEMENT CONTROL-GRADE (SHORT-TERM) AUTOMATIC INITIATION.

B. IMPLEMENT SAFETY-GRADE (LONG-TERM) AUTOMATIC INITIATION AND SUBMIT DOCUMENTATION FOR NRC STAFF REVIEW.

2. FLOW INDICATION

A. IMPLEMENT CONTROL-GRADE (SHORT-TERM) INDICATION.

B. IMPLEMENT LESSONS LEARNED, CATEGORY A TECHNICAL SPECIFICATIONS. (NRC ACTION TO CHANGE TECHNICAL SPECIFICATIONS FOLLOWING RECEIPT AND REVIEW OF LICENSEE PROPOSALS.)

C. IMPLEMENT SAFETY-GRADE (LONG-TERM) INDICATION AND SUBMIT DOCUMENTATION FOR NRC STAFF REVIEW.

MARKEY/IE
7/12/85

QUESTION 13. (CONTINUED) -3-

WITH THE ABOVE REQUIREMENTS IN MIND, THE IMPLEMENTATION STATUS FOR B&W DESIGNED PLANTS IS PROVIDED BELOW.

REGARDING LICENSEE EVALUATIONS AND COMMITMENTS, LICENSEES HAVE NOW PROVIDED EVALUATIONS AND COMMITMENTS WHICH, AFTER NRC STAFF REVIEW, WERE FOUND ACCEPTABLE.

AS A RESULT OF SHORT TERM LESSONS LEARNED IMPLEMENTATION TECHNICAL SPECIFICATIONS CONCERNING AUXILIARY FEEDWATER FLOW INDICATION ARE IN PLACE. AS LONG-TERM MODIFICATIONS ARE COMPLETED, THE TECHNICAL SPECIFICATIONS ARE BEING REVIEWED AGAIN TO DETERMINE WHETHER OR NOT FURTHER CHANGES ARE NEEDED.

WITH REGARD TO LICENSEE IMPLEMENTATION OF SYSTEM MODIFICATIONS, THE INCOMPLETE AREAS ARE LISTED BELOW.

MARKEY/IE
7/12/85

QUESTION 13. (CONTINUED)

PLANT NAME	INCOMPLETE AREAS
ARKANSAS 1	WORK IS COMPLETE ON THE ACTION PLAN ITEMS. IN RELATED MODIFICATIONS THE LICENSEE PLANS TO UPGRADE THE CONDENSATE STORAGE TANK IN 1986.
CRYSTAL RIVER 3	WORK IS COMPLETE ON THE ACTION PLAN ITEMS. IN RELATED MODIFICATIONS MOST WORK WILL BE COMPLETED DURING THE CURRENT OUTAGE AND THE CONTROL SYSTEM WILL BE UPGRADED. ONE UPGRADED TANK IS TO BE INSTALLED IN 1986.
DAVIS BESSE	WORK IS COMPLETE ON THE ACTION PLAN ITEMS. IN RELATED MODIFICATIONS, THE LICENSEE PLANS TO INSTALL A NEW PUMP/TRAIN AT THE NEXT REFUELING OUTAGE.

MARKEY/IE
7/12/85

QUESTION 13. (CONTINUED)

PLANT NAME	INCOMPLETE AREAS
Oconee 1, 2 and 3	Work is complete on the action plan items. A related question regarding seismic and tornado protection of the auxiliary feedwater system is being pursued as a plant specific topic.
Rancho Seco	Most work has been completed. Remaining work includes missile protection, upgrading flow control valves to seismic category 1 and installation of a new Emergency Feedwater Initiation and Control System. These items are scheduled for completion during the refueling outage of 1986.

MARKEY/IE
7/12/85

THREE MILE ISLAND 1	SHORT-TERM MODIFICATIONS HAVE BEEN MADE AND LONG-TERM MODIFICATIONS ARE SCHEDULED FOR COMPLETION BY THE FIRST REFUELING OUTAGE AFTER RESTART, AS REQUIRED IN CONFORMANCE WITH RELATED LICENSING BOARD DECISIONS IN THE RESTART HEARINGS.

MARKEY/IE
7/12/85

QUESTION 14. PROVIDE THE CURRENT STATUS OF IMPLEMENTATION OF ALL RECOMMENDATIONS OF NUREG-0667 AT EACH PLANT TO WHICH THEY ARE APPLICABLE.

ANSWER.

NUREG-0667 CONTAINS 22 RECOMMENDATIONS OF ACTIONS IN ORDER TO (1) REDUCE THE SENSITIVITY OF B&W REACTORS TO TRANSIENTS INVOLVING UNDERCOOLING EVENTS AND SMALL BREAK LOCA, AND (2) TO REDUCE THE LIKELIHOOD OF REACTOR TRANSIENTS BEING INITIATED BY THE INTEGRATED CONTROL SYSTEMS, NON-NUCLEAR INSTRUMENTATION AND ASSOCIATED POWER SUPPLIES. THE NUREG-0667 RECOMMENDATIONS WERE CLASSIFIED INTO HIGH PRIORITY ITEMS FOR NEAR-TERM IMPLEMENTATION (CATEGORY A) AND LOW PRIORITY ITEMS FOR LONG-TERM RECONSIDERATION (CATEGORY B). THE LONG-TERM ACTIONS HAVE NOT BEEN ISSUED AS REQUIREMENTS ALTHOUGH A NUMBER OF THEM HAVE BEEN IMPLEMENTED BY SOME UTILITIES WITH B&W PLANTS. THE IMPLEMENTATION STATUS FOR THE CATEGORY A ACTIONS AT ALL OPERATING B&W FACILITIES (INCLUDING TMI-1) IS PROVIDED ON THE ATTACHED TABLE (ITEM NUMBERS RELATE TO THE RECOMMENDATIONS CONTAINED IN NUREG-0667).

MARKEY/NRR
7/3/85

STATUS OF NUREG-0667 RECOMMENDATIONS AT B&W FACILITIES

ITEM NO.	RECOMMENDATION	STATUS
1.A	AFW SEISMIC QUAL.	ALL REVIEWS COMPLETE EXCEPT OCONEE (TO COMPLETE IN FALL 1985).
1.B	AFW DIVERSE POWER SUPPLIES	COMPLETE
1.D	SAFETY GRADE AFW	ALL COMPLETE EXCEPT TMI-1 (TO COMPLETE RESTART HEARING LONG-RANGE ITEMS BY NEXT REFUELING), RANCHO SECO (REPLACE TWO VALVES), AND CRYSTAL RIVER 3 (UPGRADE CONTROL SYSTEM). POWER SUPPLY TO TWO VALVES AT OCONEE ARE NOT SAFETY GRADE (SEE QUESTION 12)
2.B	AFW AUTO START	ALL COMPLETE EXCEPT TMI-1 (COMPLETE SYSTEM TEST AFTER RESTART, AND COMPLETE AUTOMATIC CONTROL AT NEXT REFUELING) AND CRYSTAL RIVER (ISSUE TECHNICAL SPECIFICATION)
3	DAVIS BESSE 1 DIVERSE DRIVE AFW	LICENSE CONDITION OF JANUARY 8, 1985 REQUIRES INSTALLATION AT 1986 REFUELING (SEE STAFF RESPONSE TO QUESTION NO. 5)

ITEM NO.	RECOMMENDATION	STATUS
5.A	IMPROVE ICS/NNI POWER BUS SEPARATION AND SIGNAL PATH CHANNELIZATION	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
5.C	IMPROVE ICS/NNI MULTIPLE INSTRUMENT FAILURE INDICATION	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
5.E	ICS/NNI POWER BUS REDUNDANCY	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
5.H	ICS/NNI FOLLOW-UP OF RESPONSES TO IEB 79-27	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
6	INSTALLATION OF SAFETY VITAL INSTRUMENT PANEL	INSTALLATIONS AT ALL B&W FACILITIES IS COMPLETE. STAFF REVIEW COMPLETE RANCHO SECO. REVIEW IN PROGRESS AT ANO-1, DAVIS BESSE, CRYSTAL RIVER, OCONEE, TMI-1
7	IMPROVE USE AND DISPLAY OF IN-CORE THERMOCOUPLES	COMPLETE

ITEM NO.	RECOMMENDATION	STATUS
8	SAFETY GRADE VENT AND PURGE ISOLATION ON HIGH RADIATION	ALL COMPLETE EXCEPT RANCHO SECO (ISSUE TECHNICAL SPECIFICATIONS)
13	OPERATOR TRAINING ON CRYSTAL RIVER 3 EVENT	COMPLETE
14	EMERGENCY PROCEDURES FOR LOSS OF NNI/ICS	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
15	MANDATORY SIMULATOR TRAINING FOR OPERATORS	COMPLETE
16	RCP RESTART CRITERIA	COMPLETE
17	ALTERNATE SOLUTION TO PORV UNRELIABILITY/SAFETY SYSTEM CHALLENGE	COMPLETE. FOR PARTS (A)-(F) OF ITEM 17, THE FOLLOWING ACTIONS WERE TAKEN FOR B&W FACILITIES: (A) SAFETY GRADE PORV NOT REQUIRED. (B) REDUNDANT PORV POSITION INDIC. INSTRUMENTATION INSTALLED. (C) DUAL SAFETY-GRADE PORV BLOCK VALVES NOT REQUIRED. (D) EPRI TEST PROGRAM COMPLETED. (E) ANTICIPATORY REACTOR TRIP ON TOTAL LOSS OF FEEDWATER INSTALLED. (F) PORV AND REACTOR TRIP SETPOINTS RESET. PORV LIFT PRESSURE SETPOINT IS ABOVE REACTOR TRIP SETPOINT.

Item No.	Recommendation	Status
18	IREP Crystal River 3 Study	Complete
20	RCP Trip During Small Break LOCA	Procedures in place. B&W Owners Group submittal under staff review.

QUESTION 15 AFTER CONCERNS WERE RAISED BY COMMISSIONER GILINSKY AND THEN REGION III IN 1983, TOLEDO EDISON PLEDGED TO TAKE STEPS TO IMPROVE ITS REGULATORY PERFORMANCE AND MANAGEMENT. ACCORDING TO THE NRC STAFF, THESE MEASURES WERE INEFFECTIVE. WHY DIDN'T THE NRC TAKE ACTION TO REQUIRE EFFECTIVE IMPROVEMENTS AND HAS THE NRC DETERMINED WHY THOSE ACTIONS THAT WERE TAKEN WERE NOT EFFECTIVE? ADDITIONALLY, WHAT MEASURES DOES THE COMMISSION PLAN TO TAKE NOW TO ASSURE REGULATORY AND MANAGEMENT IMPROVEMENTS AND HOW WILL THEY DIFFER FROM THOSE TAKEN OVER THE PAST TWO YEARS?

ANSWER

THE REGION III STAFF HAS WORKED CLOSELY WITH TOLEDO EDISON FOR THE PAST TWO YEARS IN AN ATTEMPT TO IMPROVE THEIR PERFORMANCE AND MANAGEMENT. WHILE IT WAS RECOGNIZED THAT IT WOULD TAKE SOME TIME TO ACHIEVE IMPROVED PERFORMANCE, THE PROGRESS WAS NOT AS TIMELY AS WE DESIRED. HOWEVER, WE ARE NOW BEGINNING TO SEE SOME POSITIVE RESULTS. SIGNIFICANT MANAGEMENT CHANGES HAVE RECENTLY BEEN ANNOUNCED AND PERSONAL INVOLVEMENT OF THE CHIEF EXECUTIVE OFFICER HAS BEEN ACHIEVED. A SUMMARY OF THE ACTIONS TAKEN BY NRC TO IMPROVE PERFORMANCE ARE AS FOLLOWS:

MARKEY/RIII

On November 4, 1983 Region III and NRR management met with Mr. Johnson, Toledo Edison's President, and other members of Toledo Edison and requested they develop a regulatory improvement program for the Davis-Besse Nuclear Plant. The request was based on concerns raised by Commissioner Gilinsky during a site tour and Region III perception that management controls were not effectively preventing violations of regulatory requirements.

In recognition of the need to increase our inspection presence onsite, the Regional Administrator authorized an additional Resident Inspector at the Davis-Besse Site. The additional Resident Inspector reported onsite in January 1984. ✓

Beginning in early 1984, Region III conducted working meetings approximately monthly at the Section Chief and Branch Chief level to provide input in the licensee's development of what they called their Performance Enhancement Program (PEP). Periodic senior management meetings were also held to monitor and assess the licensee's progress. These meetings demonstrated the licensee had progressed in selected areas, but overall progress was slow. Furthermore, in July, 1984 Region III learned that Toledo Edison management was not aggressively supporting the training program and improvements recommended by their training consultant. ?

MARKEY/RIII

DUE TO CONTINUING CONCERNS WITH THE LICENSEE'S PERFORMANCE, DURING THE MONTHS OF APRIL AND MAY, 1984 REGION III INITIATED A SPECIAL QUALITY ASSURANCE PROGRAM INSPECTION AIMED AT DETERMINING THE DEPTH OF DETERIORATION NOTED IN THE LICENSEE'S PERFORMANCE. THE INSPECTION TEAM CONCLUDED THAT WITH THE EXCEPTION OF QA PROGRAM IMPLEMENTATION PROBLEMS THE LICENSEE'S PERFORMANCE WAS PROGRESSING ADEQUATELY. (IN RETROSPECT REGION III FAILED TO FULLY APPRECIATE THE IMPLICATIONS WITH RESPECT TO THE PROGRESS OF THE LICENSEE.)

SUBSEQUENT TO THE QA INSPECTION, THERE WERE THREE INDICATORS THAT THE LICENSEE'S PROGRAM WAS NOT BEING IMPLEMENTED EFFECTIVELY: OBSERVATIONS BY THE RESIDENT INSPECTOR DID NOT SUPPORT THE CONCLUSIONS THAT PROGRESS WAS BEING MADE, A NUMBER OF TECHNICAL SPECIFICATION VIOLATIONS WERE EXPERIENCED, AND A PERFORMANCE APPRAISAL TEAM INSPECTION CONDUCTED IN AUGUST 1984 DISCLOSED A NUMBER OF SIGNIFICANT WEAKNESSES.

BASED ON THE ABOVE, THE REGIONAL ADMINISTRATOR AND THE DIRECTOR OF THE OFFICE OF INSPECTION AND ENFORCEMENT MET WITH TOLEDO EDISON SENIOR MANAGEMENT TO DISCUSS THE NEED FOR IMPROVED COMMUNICATION AND MANAGEMENT SUPPORT FOR PROGRAM IMPROVEMENTS RECOMMENDED BY THEIR OWN STAFF AND CONSULTANTS. SUBSEQUENTLY, A NOTICE OF

VIOLATION AND A PROPOSED IMPOSITION OF CIVIL PENALTIES IN THE AMOUNT OF $90,000 WAS ISSUED ON NOVEMBER 21, 1984, FOR VIOLATIONS, WHICH WERE INDICATIVE OF A BREAKDOWN IN THE LICENSEE'S MANAGEMENT CONTROL SYSTEM.

IN ADDITION THE SALP APPRAISAL GAVE THE UTILITY A CATEGORY 3 RATING IN FIVE FUNCTIONAL AREAS. THIS APPRAISAL GENERATED CONSIDERABLE NEGATIVE PUBLICITY FOR THE UTILITY. DURING THE SALP MEETING, WHICH WAS ATTENDED BY THE MEDIA, STATE AND LOCAL OFFICIALS, AND MEMBERS OF THE PUBLIC, THE REGIONAL ADMINISTRATOR TOLD UTILITY MANAGEMENT THAT "A CONTINUANCE OR FURTHER DECLINE OF THIS PERFORMANCE LEVEL AT DAVIS BESSE IS UNACCEPTABLE TO ME" AND THAT IMPROVED PERFORMANCE MUST BE REALIZED. UTILITY MANAGEMENT STATED THEY WERE COMMITTED TO IMPROVING REGULATORY PERFORMANCE AND OUTLINED A NUMBER OF ACTIONS BEING UNDERTAKEN TO ACCOMPLISH THE REGULATORY IMPROVEMENT PROGRAM. A WRITTEN RESPONSE TO THE SALP REPORT WAS SUBMITTED DESCRIBING PLANNED CORRECTIVE ACTIONS. (AS A DIRECT RESULT OF THE SALP APPRAISAL, COMMISSIONER ASSELSTINE VISITED THE DAVIS BESSE SITE ON JANUARY 11, 1985.)

IN THE SAME TIME PERIOD AS THE PUBLIC SALP MEETING, THE REGIONAL ADMINISTRATOR MET WITH THE CHIEF EXECUTIVE OFFICER OF TOLEDO EDISON (TECO) FOR A CANDID DISCUSSION OF REGULATORY PROBLEMS AT DAVIS BESSE. DURING THIS MEETING, TECO WAS ENCOURAGED TO BRING IN OUTSIDE MANAGEMENT ASSISTANCE TO DEAL WITH THEIR PROBLEMS.

MARKEY/RIII

AS FOLLOWUP TO THE SALP, THE REGIONAL ADMINISTRATOR DIRECTED THAT THE REGIONAL STAFF INCREASE THE NUMBER OF INSPECTIONS AT THE DAVIS-BESSE SITE. THE INSPECTIONS WERE DESIGNED TO REVIEW CURRENT ONGOING ACTIVITIES, AND TO MONITOR THE LICENSEE'S PROGRESS IN THEIR PERFORMANCE. WHILE IMPROVEMENTS HAVE BEEN NOTED, OVERALL PROGRESS CONTINUED TO BE SLOW. OVER 2,000 MANHOURS OF INSPECTION WERE SPENT AT THE DAVIS-BESSE SITE FROM JANUARY THROUGH MAY 1985.

IN ADDITION, THE REGIONAL ADMINISTRATOR HAS CONDUCTED PERIODIC MEETINGS WITH TOP MANAGEMENT IN AN EFFORT TO FOCUS MANAGEMENT ATTENTION ON ISSUES OF IMPORTANCE TO NRC. ALSO ON MAY 17, 1985, THE REGIONAL ADMINISTRATOR AND SENIOR NRC MANAGERS MET WITH THE CHIEF EXECUTIVE OFFICER TO HEAR FIRSTHAND THE ACTIONS BEING TAKEN TO IMPROVE REGULATORY PERFORMANCE. NRC MANAGERS ARE CONVINCED THAT THE CHIEF EXECUTIVE OFFICER IS DEDICATED TO ACHIEVING A HIGH LEVEL OF PERFORMANCE.

NOTWITHSTANDING, IN MAY OF 1985, AN ENFORCEMENT CONFERENCE WAS HELD WITH THE LICENSEE. DURING THE ENFORCEMENT MEETING, IT WAS APPARENT THAT THE MIDDLE MANAGEMENT AT TECO WAS CONTINUING TO HAVE SUBSTANTIAL INTERNAL COMMUNICATION PROBLEMS AND STILL DID NOT HAVE AN APPRECIATION TO PROMPTLY IDENTIFY AND CORRECT REGULATORY PROBLEMS. FURTHER ENFORCEMENT ACTION IS PENDING.

MARKEY/RIII

SIGNIFICANT MANAGEMENT CHANGES AT THE STATION AND CORPORATE LEVEL ARE IN PROGRESS. REGION III IS CLOSELY INVOLVED IN THE MONITORING OF NEW MANAGEMENT.

MARKEY/RIII

QUESTION 16. SHOULD COST-BENEFIT ANALYSIS BE USED TO DECIDE WHETHER TO REQUIRE A SAFETY IMPROVEMENT THAT WOULD BRING A NUCLEAR REACTOR INTO COMPLIANCE WITH NRC REGULATIONS?

ANSWER.

NO. THE LICENSEE FOR A NUCLEAR REACTOR MUST COMPLY WITH NRC REGULATIONS. IT SHOULD BE UNDERSTOOD, HOWEVER, THAT ALTERNATIVE MEANS MAY EXIST FOR COMPLYING WITH NRC REGULATIONS. COST-BENEFIT ANALYSES ARE USEFUL IN DECISIONS ON WHICH OF THE ALTERNATIVES MAY BE THE PREFERRED MEANS OF COMPLIANCE.

MARKEY/DEDROGR
7/9/85

QUESTION 17. WHAT IS THE ROLE OF COST-BENEFIT ANALYSIS IN DECIDING WHETHER TO REQUIRE A SAFETY IMPROVEMENT AT A NUCLEAR REACTOR. YOUR RESPONSE SHOULD ANSWER THE FOLLOWING QUESTIONS:

(A) HOW AND WHAT UNCERTAINTIES ARE FACTORED INTO ANY SUCH ANALYSES?

(B) WHAT COSTS ARE CONSIDERED IN ANY SUCH ANALYSIS?

(C) WHAT COSTS ARE NOT CONSIDERED IN ANY SUCH ANALYSIS?

(D) WHAT BENEFITS ARE CONSIDERED IN ANY SUCH ANALYSIS?

ANSWER

COMMISSION ASSELSTINE HAS THE FOLLOWING COMMENTS CONCERNING QUESTIONS 17.A THROUGH 17.D:

THE COMMISSION SKEWS THE COST-BENEFIT ANALYSES OF POSSIBLE SAFETY IMPROVEMENTS BY INCLUDING DIRECT AND INDIRECT COSTS (I.E., ESSENTIALLY ALL COSTS ARE TO BE CONSIDERED) AND BY LIMITING THE BENEFIT SIDE OF THE EQUATION (E.G., BY IGNORING THE UNCERTAINTIES

AND BY IGNORING THE BENEFITS OF AVERTING ANOTHER SEVERE ACCIDENT LIKE THAT WHICH OCCURRED AT TMI-2). I WOULD ALSO POINT OUT THAT THE COMMISSION DOES NOT EVEN IDENTIFY AVERTED OFF-SITE PROPERTY DAMAGE COSTS (SUCH AS CONTAMINATED PRIVATE PROPERTY AS A RESULT OF A SEVERE ACCIDENT) AS A BENEFIT OF IMPROVED SAFETY. THIS LATTER BENEFIT TYPICALLY EXCEEDS, IN DOLLAR VALUE, THE MONETIZED VALUE OF AVERTED PERSON-REM. THUS, THE COMMISSION WEIGHTS THE FACTORS TO BE CONSIDERED ON THAT SIDE OF THE EQUATION THAT WOULD LIMIT SAFETY IMPROVEMENTS (I.E., CONSIDER ESSENTIALLY ALL COSTS) AND EITHER AVOIDS DECISIONS ON OR LIMITS THE FACTORS TO BE CONSIDERED ON THE OTHER SIDE OF THE EQUATION THAT WOULD SUPPORT SAFETY IMPROVEMENTS.

THE LOGICAL CONSEQUENCE OF THIS APPROACH TO BACKFITTING IS THAT WE CAN EXPECT MORE SIGNIFICANT EVENTS LIKE THE JUNE 9, 1985 EVENT AT DAVIS BESSE BECAUSE ONLY THEN WILL THERE BE A CLEAR DEMONSTRATION OF THE BENEFITS OF A SAFETY CHANGE SUFFICIENT TO OVERCOME THE BIASES IN THE COMMISSION'S BACKFIT STANDARD AND COST-BENEFIT ANALYSES.

QUESTION 17. WHAT IS THE ROLE OF COST-BENEFIT ANALYSIS IN DECIDING WHETHER TO REQUIRE A SAFETY IMPROVEMENT AT A NUCLEAR REACTOR. YOUR RESPONSE SHOULD ANSWER THE FOLLOWING QUESTIONS:

(A) HOW AND WHAT UNCERTAINTIES ARE FACTORED INTO ANY SUCH ANALYSES?

ANSWER.

THE COMMISSION'S POLICY FOR CONDUCT OF COST-BENEFIT ANALYSES IS DOCUMENTED IN NUREG/BR-0058, REVISION 1, "REGULATORY ANALYSIS GUIDELINES OF THE U.S. NUCLEAR REGULATORY COMMISSION, MAY 1984. NUREG/CR-3568, "A HANDBOOK FOR VALUE-IMPACT ASSESSMENT," DECEMBER 1983, IS AVAILABLE FOR METHODOLOGICAL REFERENCE.

COST-BENEFIT ANALYSIS IS PART OF THE CONSIDERATIONS THAT GUIDE DECISIONS CONCERNING PROPOSED NEW OR CHANGED GENERIC REQUIREMENTS. IT IS, FURTHER, PART OF THE CONSIDERATIONS IN DETERMINATION OF WHETHER A REQUIREMENT SHOULD BE BACKFITTED TO PLANTS ALREADY LICENSED. HOWEVER, COST-BENEFIT ANALYSIS IS NOT USED WHEN IT IS NECESSARY FOR A PLANT TO COME INTO COMPLIANCE WITH NRC REGULATIONS OR MEET AN ACCEPTABLE LEVEL OF SAFETY. IN SUCH INSTANCES THE PLANT SIMPLY MUST COMPLY WITH SUCH REGULATIONS AND MEET THE ACCEPTABLE LEVEL OF SAFETY.

(A) UNCERTAINTIES ARE OF THREE GENERAL TYPES: ① VARIABILITY OF DATA, ② ACCURACY OF MODELS AND ③ OMISSION. IN SOME ANALYSES THE VARIABILITY OF DATA IS EXPLICITLY CALCULATED USING THE MATHEMATICAL RULES FOR COMBINING UNCERTAINTY. HOWEVER, THIS IS RECOGNIZED AS BEING MORE PRECISE THAN USUALLY JUSTIFIED BY THE CURRENT KNOWLEDGE OF THE ACTUAL STATISTICAL VARIANCE OF DATA SUCH AS COMPONENT FAILURE RATES. MODELS OF SYSTEM BEHAVIOR BOTH FOR RELIABILITY AND PERFORMANCE ARE INACCURATE TO VARYING AND USUALLY UNKNOWN DEGREES. THE EVENT AND FAULT TREE MODELS MAY NOT ACCURATELY REPRESENT THE SYSTEM FUNCTIONS. FOR EXAMPLE THESE MODELS ARE USUALLY BINARY, THAT IS THE SYSTEM EITHER FAILS OR SUCCEEDS. BUT MANY SYSTEMS CAN HAVE A SPECTRUM OF PARTIAL SUCCESS (OR FAILURE). THE POSSIBILITY OF OMISSIONS CAN NEVER BE TOTALLY EXCLUDED. ALL OF THE EVENTS SUCH AS INITIATING EVENTS AND SUBSEQUENT BRANCHING SEQUENCES MAY NOT BE IDENTIFIED. UNKNOWN OR UNRECOGNIZED PHYSICAL PHENOMENA MAY OCCUR. THEREFORE, UNCERTAINTY CANNOT BE AND IS NOT FACTORED INTO ANALYSES BY A RIGOROUS RULE OR FORMULA. THE UNCERTAINTIES IN EACH ANALYSIS MUST BE EVALUATED FOR THAT SPECIFIC ANALYSIS.

Unknown uncertainty

✓

because it is unknown

THE INEVITABLE SUBSTANTIAL UNCERTAINTIES INVOLVED IN PROBABILISTIC RISK ASSESSMENTS LEAD TO A DULY CAUTIOUS USE OF COST-BENEFIT ANALYSIS RESULTS. WHEN UNCERTAINTIES ARE UNUSUAL IN STRUCTURE OR UNUSUALLY LARGE, OR WHEN THE ISSUE INVOLVED IS PARTICULARLY SENSITIVE TO THEM, SENSITIVITY ANALYSES MAY BE PERFORMED, TO DETERMINE THE EFFECT OF ALTERNATIVE REASONABLE ASSUMPTIONS ON THE OUTCOME. IMPORTANT SPECIFIC UNCERTAINTIES ARE QUANTIFIED WHEN PRACTICAL AND MEANINGFUL, BUT ARE QUALITATIVELY RECOGNIZED WHEN THEY CANNOT BE QUANTIFIED. THE COST-BENEFIT ANALYSIS RESULTS ARE TAKEN INTO ACCOUNT WITH A CONSIDERATION OF THE UNCERTAINTIES, TO HELP REACH DECISIONS WITH A REASONABLE CONFIDENCE COMMENSURATE WITH THE POTENTIAL CONSEQUENCES OF ERROR.

COMMISSIONER ASSELSTINE ADDS THE FOLLOWING:

THE MOST STRAIGHTFORWARD RESPONSE TO THE QUESTION OF HOW UNCERTAINTIES ARE FACTORED INTO COMMISSION DECISIONS ON WHETHER TO REQUIRE A SAFETY IMPROVEMENT IS: THEY ARE NOT. EXAMPLES WHICH ILLUSTRATE THE COMMISSION'S REFUSAL TO CONSIDER UNCERTAINTIES IN ITS DECISIONMAKING INCLUDE: THE INDIAN POINT SPECIAL PROCEEDING, THE SEVERE ACCIDENT POLICY STATEMENT, THE

PROPOSED BACKFIT RULE AND THE PROVISIONAL SAFETY GOAL POLICY STATEMENT. THE COMMISSION'S TREATMENT OF UNCERTAINTIES IS DESCRIBED IN NUREG-1070 "NRC POLICY ON FUTURE REACTOR DESIGNS-DECISIONS ON SEVERE ACCIDENT ISSUES IN NUCLEAR POWER PLANT REGULATION." SEE ATTACHED PAGES 133-140. I FIND THAT DISCUSSION WOEFULLY INADEQUATE.

FURTHER, THE COMMISSION'S TYPICAL PRACTICE IS TO RELY ON A "POINT ESTIMATE" IN REACHING A DECISION. THE "POINT ESTIMATE" ITSELF IS FREQUENTLY A FAULTY NUMBER TO THE EXTENT THAT THE SO-CALLED "MEDIAN" VALUE OF RISK IS USED. THE MEDIAN VALUE IS THAT POINT ON A SPECTRUM OF ESTIMATED RISKS AT WHICH HALF OF THE VALUES FALL ABOVE AND HALF FALL BELOW. THE COMMISSION OFTEN ARBITRARILY CHOOSES THAT POINT FOR PURPOSES OF REACHING DECISIONS. HOWEVER, USE OF THE MEAN OR "EXPECTED VALUE" OF RISK, WHICH IS THE AVERAGE VALUE OF THE SPECTRUM OF RISKS, IS THE MORE DEFENSIBLE APPROACH. THE ACRS RECOMMENDED, DURING ITS JULY 11, 1985 MEETING WITH THE COMMISSION, THAT THE MEAN VALUE RATHER THAN THE MEDIAN ESTIMATE BE USED AND NOTED THAT USE OF THE MEDIAN RATHER THAN MEAN ESTIMATE CAN RESULT IN A SUBSTANTIAL UNDERESTIMATE OF THE EFFECTS OF UNCERTAINTIES IN MAKING REACTOR ACCIDENT RISK ESTIMATES.

QUESTION 17. (B) WHAT COSTS ARE CONSIDERED IN ANY SUCH ANALYSIS?

ANSWER.

ALL COSTS ATTRIBUTABLE TO A SAFETY IMPROVEMENT ARE CONSIDERED. THESE INCLUDE COSTS BORNE BY ANY SEGMENT OF THE ECONOMY, INCLUDING THE INDUSTRY, THE NRC AND OTHER GOVERNMENT ENTITIES, AND THE PUBLIC. THE COSTS ARE TAKEN INTO ACCOUNT AS NET COSTS, I.E., WHEN ONE COST ELEMENT IS SUBSTITUTED FOR ANOTHER, THE DIFFERENCE IS COUNTED. FUTURE COSTS ARE DISCOUNTED TO PRESENT WORTH. COSTS ARE MULTIPLIED BY THE PROBABILITY OF THEIR OCCURRENCE DURING THE LIFETIME OF THE PLANT.

THE LICENSEE'S COSTS INCLUDE THE NET COST TO DESIGN, ANALYZE, PURCHASE, LICENSE, AND INSTALL STRUCTURES OR EQUIPMENT; HIRE, PAY, TRAIN, AND LICENSE ANY NEW PERSONNEL; AND WRITE, REVIEW, REVISE, AND GET APPROVAL OF ANY ADMINISTRATIVE, OPERATING OR EMERGENCY PROCEDURES. ALSO INCLUDED ARE THE ADDITIONAL COSTS OF REPLACEMENT POWER DUE TO SHUTDOWN (OR START-UP DELAY) TO MAKE CHANGES, AND ANY COST DIFFERENTIALS DUE TO DECREASED (OR INCREASED) PLANT RELIABILITY BECAUSE OF CHANGES.

NRC COSTS, WHICH ARE USUALLY MUCH LESS THAN THE LICENSEE'S COSTS, INCLUDE THE COST TO DEVELOP, IMPLEMENT, REVIEW, AND INSPECT ANY NEW REQUIREMENT.

QUESTION 17. (c) WHAT COSTS ARE NOT CONSIDERED IN ANY SUCH ANALYSIS?

ANSWER.

HIGHLY INDIRECT AND SPECULATIVE COSTS ARE NOT CONSIDERED. (FOR EXAMPLE, THE POSSIBLE INTERNATIONAL TRADE IMPACT OF NUCLEAR-PLANT DOWN TIME, THROUGH POSSIBLE SUBSTITUTION OF OIL-FIRED CAPACITY, IS VIEWED AS TOO SPECULATIVE AN IMPACT TO RECOGNIZE.)

SINCE THE NET NATIONAL COST IMPACT IS SOUGHT, AND COSTS ARE CONSIDERED REGARDLESS OF WHO BEARS THEM, TRANSFER PAYMENTS (SUCH AS TAXES AND INSURANCE PREMIUMS AND PAYMENTS) ARE NOT CONSIDERED.

THE AVERTED COST OF PLANT DAMAGE AND ITS EFFECT ON THE NET COST AND ON THE COST-BENEFIT RELATION ARE STATED SEPARATELY. THE QUESTION OF WHETHER AND TO WHAT EXTENT TO TAKE SUCH AVERTED COSTS INTO ACCOUNT IS UNSETTLED. IT IS BEING CONSIDERED AS PART OF THE NRC SAFETY GOAL EVALUATION PROGRAM.

QUESTION 17. (D) WHAT BENEFITS ARE CONSIDERED IN ANY SUCH ANALYSIS?

ANSWER.

THE BENEFITS CONSIDERED ARE THE SAFETY AND OTHER (ENVIRONMENTAL, PUBLIC PROPERTY, NATIONAL-SECURITY, AND ANTI-TRUST) VALUES THAT IT IS THE NRC'S MISSION TO PROTECT.

BENEFITS ARE QUANTIFIED WHEN IT IS PRACTICAL TO DO SO IN A MEANINGFUL WAY, BUT ARE TAKEN INTO ACCOUNT QUALITATIVELY WHEN THEY CANNOT BE QUANTIFIED.

IN COST-BENEFIT ANALYSIS OF PROPOSED SAFETY IMPROVEMENTS, THE BENEFITS INVOLVED USUALLY APPEAR AS A NET RISK REDUCTION, EXPRESSED IN PERSON-REM OF RADIATION DOSE TO THE PUBLIC AND WORKERS, PROBABILISTICALLY ESTIMATED FOR THE REMAINING PLANT LIFE.

QUESTION 17. (E) WHAT BENEFITS ARE NOT CONSIDERED IN ANY SUCH ANALYSIS?

ANSWER.

PRIVATE ECONOMIC BENEFITS, SUCH AS ECONOMIC BENEFIT TO THE LICENSEES, ARE NOT CONSIDERED AS SUCH. (THEY MAY, HOWEVER, ENTER AS FAVORABLE COST IMPACTS IN THE COMPUTATION OF NET COSTS, AS DISCUSSED UNDER (B) AND (C), ABOVE.)

QUESTION 18. Should cost-benefit analysis be used to decide whether to require Davis Besse to install a third auxiliary feedwater pump when it does not meet the Standard Review Plan reliability criterion and when no other U.S. reactor has the same design vulnerability of only two steam driven pumps?

ANSWER.

The existing NRC regulations (10 CFR Part 50, Appendix A General Design Criteria) require the design of a safety system with suitable redundancy to meet the single failure criterion and to accomplish its safety function assuming a single failure with either onsite electric power or off-site power unavailable. In general, a two train safety system would be expected to meet such General Design Criteria (GDC).

As the GDC notes, the minimum acceptable redundancy and diversity of subsystems and the required interconnection and independence of the subsystems have not yet been developed or defined as part of the regulations. Several reactor plants built under these regulations chose to design the auxiliary feedwater systems with use of steam turbine driven pumps only. (For example, Davis-Besse,[1] Turkey Point 3 and 4, Calvert Cliffs[1] 1 and 2 and Haddam Neck[1]

---

[1] Used two steam driven pumps.

ALL USED STEAM TURBINE PUMPS.) THESE SYSTEMS ARE CONSISTENT WITH THE GDC REGULATIONS AND CAN HAVE THE ADVANTAGE OF BEING LESS DEPENDENT ON AC POWER SUPPLIES.

SUBSEQUENT TO THE TMI-2 ACCIDENT AND THE CONDUCT OF AFWS STUDIES REPORTED IN NUREG 0611 AND 0635, THE STAFF CHOSE TO IMPROVE ITS DEFINITION OF THE RELIABILITY AND DIVERSITY SOUGHT FOR THE AFWS DESIGN. THIS WAS DONE THROUGH THE STANDARD REVIEW PLAN (SRP). THESE EFFORTS LED TO THE STAFF'S RECOGNITION OF AFWS DESIGN VULNERABILITIES AND THE POTENTIAL USEFULNESS AND NEED FOR ADDITIONAL REDUNDANCY AND DIVERSITY. THIS RECOGNITION CAME ABOUT INDEPENDENT OF ANY COST-BENEFIT ANALYSES. THE SRP WAS SUBSEQUENTLY CODIFIED INTO THE REGULATIONS AND ANY APPLICATIONS (FOR PLANT OPERATING LICENSES, CONSTRUCTION PERMITS, MANUFACTURING LICENSES AND PRELIMINARY OR FINAL DESIGN APPROVAL FOR STANDARD PLANTS) DOCKETED AFTER MAY 17, 1982 ARE REQUIRED TO EVALUATE CONFORMANCE WITH THE SRP.

PLANTS SUCH AS DAVIS BESSE LICENSED TO OPERATE PRIOR TO THIS DATE HAVE BEEN JUDGED TO HAVE AN AFWS DESIGN MEETING THE MINIMUM REQUIREMENTS OF NRC REGULATIONS. OUR RESPONSE TO QUESTION 16 STATES THAT A NUCLEAR REACTOR MUST COMPLY WITH NRC REGULATIONS. THE DAVIS BESSE TWO TRAIN AFW DESIGN DOES COMPLY WITH THE NRC REGULATIONS. THE STAFF HAS, HOWEVER, RECOMMENDED IMPROVEMENTS TO

THE AFWS RELIABILITY SINCE 1979 AS THE CHRONOLOGY OF THIS MATTER REVEALS. (SEE PREVIOUS NRC RESPONSES TO REP. MARKEY QUESTIONS OF JUNE 17, 1985.) FOR DAVIS BESSE THE STAFF RECOMMENDED THAT AFWS RELIABILITY IMPROVEMENTS BE ACHIEVED BY ADDITION OF A THIRD AND DIVERSE POWERED AFW PUMP; THE LICENSEE WAS NOT IN AGREEMENT WITH THIS RECOMMENDATION. WHEN SAFETY IMPROVEMENTS SUCH AS THESE BEYOND THE NRC REGULATIONS ARE BEING SOUGHT, IT IS EXPECTED THAT THE STAFF AND THE LICENSEE WILL CONTINUE TO USE COST-BENEFIT TECHNIQUES TO EXPLORE THE MERITS OF VARIOUS SAFETY ALTERNATIVES THAT MAY BE AVAILABLE.

COMMISSIONER ASSELSTINE ADDS THE FOLLOWING:

DAVIS BESSE AS WELL AS MOST OTHER OPERATING PLANTS WERE "GRANDFATHERED" FROM ANY RELIABILITY REQUIREMENT OR OBJECTIVE. THUS, BECAUSE THE PARTICULAR DESIGN OF THE AUXILIARY FEEDWATER SYSTEM FOR THOSE PLANTS MET THE COMMISSION'S REGULATIONS WHEN THEY WERE LICENSED, THE COMMISSION USES COST-BENEFIT ANALYSES IN DECIDING WHETHER TO REQUIRE ENHANCED RELIABILITY IN THAT SAFETY SYSTEM EVEN IF THE PARTICULAR DESIGN HAS LOW RELIABILITY. GIVEN THE WAY THE COMMISSION CONDUCTS COST-BENEFIT ANALYSES AND WEIGHS THE FACTORS TO BE CONSIDERED (SEE MY COMMENTS IN RESPONSE TO QUESTION 17), I FIND THIS AN INADEQUATE WAY OF GOING ABOUT PROTECTING THE PUBLIC HEALTH AND SAFETY.

QUESTION 19. Does the Committee to Review Generic Requirements and the Executive Director for Operations have any authority over the decisions and judgments of the Director of Nuclear Reactor Regulation to require safety improvements at nuclear reactors?

ANSWER.

The CRGR does not have any authority over the decisions and judgments of the Director, NRR. However, in accordance with the Commission approved CRGR charter, all significant generic actions proposed by NRR to be implemented upon a class of nuclear power plants, licensees, or applicants are required to be reviewed by the CRGR. In accordance with the CRGR Charter, the CRGR makes recommendations to the EDO concerning approval or disapproval of proposed generic requirements which have been forwarded by the NRR director (or other Office Director) for CRGR consideration.

An explanation of the EDO's authority over the decisions and judgments of the NRR Director follows:

Section 4(c) of Reorganization Plan No. 1 of 1980, as amended, provides that "[t]he function of the Director[] of Nuclear Reactor Regulation...of reporting directly to the Commission is hereby transferred so that such officer[] report[s] to the Executive Director for Operations." The legislative history of the Plan clarifies the nature of this reporting relationship. The purpose

OF SECTION 4(C) OF THE PLAN IS TO STREAMLINE THE REPORTING AND SUPERVISION OF LINE OFFICE DIRECTORS. S. REP. NO. 790, 96TH CONG., 2ND SESS. 22 (1980).

MARKEY/DEDROGR
REVISED 7/16/85

QUESTION 20 PLEASE PROVIDE THE FOLLOWING INFORMATION:

A. AN ESTIMATE OF HOW MUCH WOULD IT COST TOLEDO EDISON TO HAVE INSTALLED, IN 1980, THE PUMP THAT IS NOW PLANNED TO BE INSTALLED IN 1986? HOW MUCH WILL THE PUMP AND ITS INSTALLATION COST IN 1986?

ANSWER

ON DECEMBER 31, 1981 TOLEDO EDISON PROVIDED THE NRC WITH COST COMPARISONS FOR IMPROVEMENTS TO THE AUXILIARY FEEDWATER SYSTEM. THE COMPARISON WAS PREPARED FOR TWO SYSTEMS CONFIGURATIONS WHICH INCLUDED THE ADDITION OF A THIRD TRAIN OF AUXILIARY FEEDWATER AND AN UPGRADE CONFIGURATION BASED ON THE RELIABILITY STUDY CONDUCTED BY EDS. THIS COMPARISON IS SHOWN BELOW.

CONFIGURATION	OVERALL FIGURE OF MERIT	IMPROVEMENTS OVER POST-TMI-2 CONFIGURATION	ASSOCIATED COST (ESTIMATED)
THIRD TRAIN	2.2×10^{-4}	FACTOR OF 15	$1,200,000
ANALYSIS BASED	-1.4×10^{-4}	FACTOR OF 24	$ 300,000

MARKEY/RIII

QUESTION 20 A (CONTINUED) - 2 -

TOLEDO EDISON ESTIMATES THAT IT WILL COST APPROXIMATELY $1,800,000 TO INSTALL THE ADDITIONAL PUMP IN 1986. IT SHOULD BE NOTED THE CONFIGURATION OF THE THIRD TRAIN ESTIMATED IN 1981 AND LISTED ABOVE IS DIFFERENT THAN THE ONE PLANNED TO BE INSTALLED IN 1986 THEREFORE A COMPARISON OF THE COST INVOLVED IS NOT APPROPRIATE.

QUESTION 20 B. HOW MUCH DID TOLEDO EDISON PAY FOR THE RELIABILITY ANALYSIS BY EDS NUCLEAR INC.?

ANSWER

TOLEDO EDISON VERBALLY INFORMED THE NRC THAT THE COST OF THE EDS ANALYSIS WAS $248,660.

MARKEY/RIII

QUESTION 20. (c) HOW MUCH DID NRC PAY FOR THE BROOKHAVEN STUDY WHICH EVALUATED THE EDS RELIABILITY ANALYSIS?

ANSWER.

APPROXIMATELY $15,000.

MARKEY II/NRR
7/3/85

QUESTION 20 D. AN ESTIMATE OF HOW MUCH TOLEDO EDISON HAS EXPENDED SINCE 1979 ON IMPROVEMENTS TO THE AUXILIARY FEEDWATER SYSTEM THAT WERE USED TO JUSTIFY NOT INSTALLING A THIRD AUXILIARY FEEDWATER PUMP?

ANSWER

TOLEDO EDISON DOES NOT HAVE THIS INFORMATION READILY AVAILABLE.

MARKEY/RIII

QUESTION 20 PLEASE PROVIDE THE FOLLOWING INFORMATION:

E. AN ESTIMATE OF THE COST AND STAFF HOURS EXPENDED SINCE 1980 TO EVALUATE WHETHER DAVIS-BESSE SHOULD INSTALL A THIRD AUXILIARY FEEDWATER PUMP

ANSWER

STARTING WITH F.Y. 81, OUR RECORDS SHOW THAT A TOTAL OF 400 PROFESSIONAL STAFF HOURS HAVE BEEN EXPENDED ON AUXILIARY FEEDWATER RELIABILITY ISSUES. OF THIS, AT LEAST 98 PROFESSIONAL STAFF HOURS CAN BE SPECIFICALLY IDENTIFIED AS RELATED TO THE DIVERSE-POWERED PUMP ISSUE. SOME OF THE REMAINING 302 HOURS EXPENDED ALSO RELATE TO THIS ISSUE BUT CANNOT BE SPECIFICALLY SO IDENTIFIED.

IN ADDITION, CONTRACTOR COSTS RELATED TO EVALUATING THE LICENSEE'S RELIABILITY STUDY AND PRODUCING AN INDEPENDENT ESTIMATE WERE $15,000. THE CONTRACTOR EFFORT WAS RELATED TO THE DAVIS-BESSE AUXILIARY FEEDWATER RELIABILITY REVIEW, AND IT IS NOT POSSIBLE TO DETERMINE WHAT PART OF THAT EFFORT WAS DIRECTLY INVOLVED WITH THE THIRD PUMP ISSUE.

MARKEY II/NRR
7/3/85

QUESTION 20 F. What has the June 9, 1985 incident cost Toledo Edison up till now? Please include an estimate of replacement power costs per day.

ANSWER

The NRC believes that the major additional cost incurred by the owners of the Davis-Besse reactor since the June 9, 1985 event is the replacement energy cost. Assuming Davis-Besse would have had a typical availability factor over the 34 day period from June 9, 1985 through July 12, 1985, this cost is estimated by the NRC to be about $10 million. It is likely that there have been some other additional utility costs incurred as a result of this event, however, it is believed that these costs are small in comparison to the replacement energy cost penalty.

The above estimate is based on an average daily replacement energy cost for Davis-Besse of $273,000. This amount is derived from power pool production cost simulations which estimate the difference in total variable costs when the Davis-Besse unit is available for generation and when it is not.

MARKEY/RIII

CHAIRMAN

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

October 18, 1935

The Honorable Edward J. Markey, Chairman
Subcommittee on Energy Conservation and Power
Committee on Energy and Commerce
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

In our letters dated July 17 and July 24, the Commission responded to your letters of June 17 and June 24 concerning the Davis-Besse incident. As we noted at the time, some of our responses were preliminary. Further information is now available in a number of areas. We are providing the enclosed updated responses in order to keep the Subcommittee currently informed in this area.

Sincerely,

Nunzio J. Palladino

Nunzio J. Palladino

Enclosures:
As stated

cc: The Honorable Carlos J. Moorhead

ENCLOSURE 1

UPDATES TO REPRESENTATIVE MARKEY'S QUESTIONS OF JUNE 17, 1985

QUESTION 3.

HAD THE ELECTRIC DRIVEN PUMP NOT MANUALLY STARTED DURING THE DAVIS-BESSE INCIDENT, AND HAD THE AUXILIARY FEEDWATER SYSTEM NOT BEEN RESTORED, WOULD THERE HAVE BEEN A SEVERE CORE DAMAGE ACCIDENT. IF YES, HOW LONG WOULD IT HAVE TAKEN BEFORE FUEL DAMAGE OCCURRED?

ANSWER

SUPPLEMENTAL INFORMATION IS PROVIDED AS FOLLOWS:

CALCULATIONS ARE CURRENTLY BEING PERFORMED, USING ADVANCED, STATE-OF-THE-ART COMPUTER CODES, TO EXAMINE THE JUNE 9, 1985 DAVIS-BESSE EVENT. THESE ANALYSES SIMULATE THE OPERATOR ACTION, AS SPECIFIED IN THE DAVIS-BESSE EMERGENCY PROCEDURES, FOR THE SITUATION WHERE FEEDWATER IS NEVER RECOVERED. THE OPERATOR ACTIONS SIMULATED WERE OPENING THE PORV AND THE HIGH POINT VENTS, AND INITIATING FULL MAKEUP FLOW.

AS NOTED IN NUREG-1154, THE SHIFT SUPERVISOR DID NOT INITIATE MU/HPI COOLING AS SPECIFIED BY THE EMERGENCY PROCEDURES. WHILE THE SHIFT SUPERVISOR WAS AWARE THAT MU/HPI COOLING MIGHT HAVE BECOME NECESSARY, HE WAITED FOR THE EQUIPMENT OPERATORS TO RECOVER THE AUXILIARY FEEDWATER SYSTEM. SINCE AUXILIARY FEEDWATER WAS RECOVERED IN A TIMELY MANNER, MU/HPI COOLING WAS NEVER NECESSARY. HOWEVER, NUREG-1154 DOES NOTE THAT THE SHIFT SUPERVISOR WOULD HAVE INITIATED MU/HPI COOLING IF "IT COMES TO THAT."

IN PERFORMING THE ANALYSIS OF THE DAVIS-BESSE EVENT, THE SPECIFIED OPERATOR ACTIONS IN THE EMERGENCY PROCEDURES WERE SIMULATED TO BE INITIATED AT VARIOUS TIMES FOLLOWING STEAM GENERATOR DRYOUT. THE RESULTS OF THE ANALYSES PERFORMED TO DATE INDICATE THAT THE OPERATOR HAD AT LEAST TWENTY MINUTES FOLLOWING STEAM GENERATOR DRYOUT TO PREVENT SEVERE FUEL DAMAGE. DOCUMENTATION OF THE ANALYSIS RESULTS IS PROVIDED IN THE ATTACHED REPORT ENTITLED "RAPID-RESPONSE ANALYSIS OF THE DAVIS-BESSE LOSS-OF-FEEDWATER EVENT ON JUNE 9, 1985," SEPTEMBER 1985.

IN ADDITION, OUR PREVIOUS RESPONSE, WHICH WAS BASED UPON SIMPLIFIED MASS AND ENERGY CALCULATIONS, ESTIMATED FUEL DAMAGE AT APPROXIMATELY ONE AND ONE-HALF (1½) TO TWO (2) HOURS, IF FEEDWATER WAS NEVER RECOVERED AND NO MITIGATIVE OPERATOR ACTION WAS TAKEN. PRELIMINARY COMPUTER CALCULATIONS INDICATE THAT CORE UNCOVERY WOULD HAVE OCCURRED AT APPROXIMATELY EIGHTY MINUTES. WE ESTIMATE THAT SEVERE CORE DAMAGE WOULD OCCUR APPROXIMATELY THIRTY MINUTES LATER. THUS, THESE COMPUTER CALCULATIONS CONFIRM OUR PREVIOUS ESTIMATES.

QUESTION 4. ACCORDING TO PRELIMINARY INFORMATION PROVIDED BY THE NRC STAFF, THE EMERGENCY CORE COOLING SYSTEM (ECCS) AT DAVIS-BESSE IS UNABLE TO FUNCTION PROPERLY WHEN THE PRIMARY COOLING SYSTEM IS PRESSURIZED IN EXCESS OF 1,600 POUNDS PER SQUARE INCH. (IF THIS IS TRUE, WHY DID THE OPERATORS INITIATE THE ECCS DURING THE DAVIS-BESSE INCIDENT AND WHY DID THEY TERMINATE ECCS)? WHAT OTHER PRESSURIZED WATER REACTORS (PWR) HAVE HIGH PRESSURE INJECTION PUMPS WHOSE SHUTOFF HEAD IS BELOW THE SETPOINT OF THE CODE SAFETY VALVES?

ANSWER.

IN SUPPLEMENT TO OUR PREVIOUS RESPONSE, THE OPERATOR INITIATED ECCS FLOW BECAUSE REACTOR COOLANT SYSTEM PRESSURE WAS DECREASING AS A CONSEQUENCE OF THE RE-INITIATION OF AFW FLOW. SHORTLY AFTER INITIATION OF ECCS FLOW REACTOR COOLANT PRESSURE WAS RESTORED ABOVE THE 1830 PSIG WHICH IS PROVIDED BY THE ECCS SYSTEM IN PIGGY-BACK OPERATION. THEREFORE, THE OPERATOR TERMINATED OPERATION OF ECCS PUMPS. THIS ISSUE IS DISCUSSED IN MORE DETAIL AT PAGE 3-11 OF NUREG-1154.

QUESTION 8. PROVIDE A HISTORY OF ANY PREVIOUSLY NOTED DIFFICULTIES OBSERVED WITH THE MAIN OR AUXILIARY FEEDWATER SYSTEMS AT DAVIS-BESSE SINCE 1979 AND ANY ACTIONS TAKEN IN RESPONSE.

ANSWER.

THE FOLLOWING IS PROVIDED AS AN UPDATE OF OUR PREVIOUS RESPONSE.

AUXILIARY FEEDWATER SYSTEM PIPE RESTRAINTS

THE LICENSEE HAS ALMOST COMPLETED A WALKDOWN AND ANALYSIS OF THE AFWS PIPE RESTRAINTS. BASED ON A PARTIAL REVIEW OF THE FINDINGS BY REGION III AND SUBSEQUENT DISCUSSIONS WITH THE LICENSEE, TED HAS EXPANDED ITS WALKDOWN TO TWO OTHER SAFETY SYSTEMS SELECTED BY THE NRC. THE RESULTS OF THIS EXPANDED WALKDOWN WILL BE EVALUATED BY THE NRC.

MAIN FEEDWATER SYSTEM

AS PART OF THEIR INVESTIGATION OF THE JUNE 9 EVENT, THE INVESTIGATING TEAM IDENTIFIED A LIST OF EQUIPMENT FAILURES TO BE ADDRESSED BY THE LICENSEE INCLUDING CONTROL PROBLEMS WITH THE MAIN FEEDWATER PUMPS (MFPS). THE LICENSEE HAS IDENTIFIED AND CORRECTED THE EQUIPMENT FAILURE THAT CAUSED THE NUMBER 1 MFP TO TRIP DURING JUNE 9 (CONTROL BOARD CIRCUIT FAILURE). THE LICENSEE IS CONTINUING TO EVALUATE THE OVERALL RELIABILITY PROBLEMS WITH THE MFW SYSTEM.

QUESTION 9. WHAT ARE THE GENERIC IMPLICATIONS AND LESSONS LEARNED FROM THE DAVIS-BESSE INCIDENT?

ANSWER.

OUR PREVIOUS ANSWER IS UPDATED, AS FOLLOWS:
THE NRC HAS DETERMINED THAT THERE ARE NO GENERIC ISSUES OF IMMEDIATE SAFETY SIGNIFICANCE RESULTING FROM THE DAVIS-BESSE INCIDENT. A COPY OF THIS DETERMINATION DATED AUGUST 19, 1985 FROM H. THOMPSON, JR. TO T. SPEIS IS PROVIDED IN ENCLOSURE 3.

SEVERAL ISSUES WERE IDENTIFIED AS CANDIDATES FOR NEAR-TERM GENERIC ACTION AND THEY ARE CURRENTLY BEING EVALUATED BY THE STAFF TO DETERMINE IF LICENSEE ACTION, ON A GENERIC BASIS, IS NECESSARY. THESE ISSUES ARE:

(A) POTENTIAL INABILITY TO REMOVE REACTOR DECAY HEAT DUE TO QUESTIONABLE RELIABILITY OF THE AUXILIARY FEED SYSTEM AS IT RELATES TO DISCHARGE VALVE FAILURES, DIFFICULTIES IN RECOVERING AUXILIARY FEEDWATER PUMPS, OR FAILURES IN STEAM LINE BREAK MITIGATION SYSTEM.

(B) ADEQUACY OF EMERGENCY PROCEDURES, OPERATOR TRAINING AND PLANT MONITORING SYSTEMS FOR DETERMINING NEED TO INITIATE FEED AND BLEED COOLING FOLLOWING LOSS OF STEAM GENERATOR HEAT SINK;

(C) PHYSICAL SECURITY SYSTEM CONSTRAINTS WHICH COULD DENY TIMELY OPERATOR ACCESS TO VITAL EQUIPMENT AND INHIBIT OPERATOR FROM PERFORMING LOCAL MANUAL OPERATIONS CALLED FOR IN EMERGENCY PROCEDURES.

(D) ADEQUACY OF THE ENGINEERING BASIS AND PROCEDURES FOR SETTING TORQUE SWITCH AND TORQUE BYPASS SWITCH SETTINGS FOR SAFETY RELATED VALVES.

THE STAFF IS STILL EVALUATING THE DAVIS-BESSE INCIDENT TO DETERMINE IF THERE ARE POTENTIAL GENERIC ISSUES OF A LONG-TERM NATURE.

QUESTION 10: IN LIGHT OF THE DAVIS-BESSE INCIDENT, IS THERE ANY INFORMATION OF WHICH THE COMMISSION IS AWARE THAT WOULD LEAD IT TO RECONSIDER ANY OF THE POSITIONS TAKEN BY THE NRC STAFF, OR IN ANY OF ITS OWN DECISIONS, IN THE TMI RESTART PROCEEDING? FOR EXAMPLE, IN THE TMI RESTART PROCEEDING, THE NRC STAFF CONTENDED THAT A TOTAL LOSS OF FEEDWATER WAS BEYOND THE DESIGN BASIS AND, THEREFORE, CAPABILITY TO ACCOMPLISH FEED AND BLEED WAS NOT REQUIRED.

ANSWER.

THERE IS NO INFORMATION AS A RESULT OF THE DAVIS-BESSE INCIDENT OF WHICH THE STAFF IS AWARE THAT WOULD LEAD IT TO RECONSIDER ANY OF THE POSITIONS TAKEN BY THE STAFF THAT WOULD AFFECT COMMISSION DECISIONS IN THE TMI RESTART PROCEEDING. A PRELIMINARY REVIEW OF THE FACT FINDING TEAM REPORT (NUREG-1154) HAS PRODUCED NO INFORMATION WHICH WOULD CHANGE THE STAFF POSITION.

QUESTION 11. List those TMI Action Plan items directly relevant to the Davis-Besse incident and provide the current status of compliance. Specifically, included in your response should be a detailed explanation of what actions were taken and when in response to those TMI Action Plan items concerning the auxiliary feedwater system and pilot operated relief valve. Your response should clearly identify those relevant Action Plan items that have not been fully implemented and explain when each item was originally scheduled to have been completed and the reason it remains outstanding.

ANSWER.

One item in our previous report is updated as follows:

I.D.1	Control-room Design Reviews	Consistent with our Confirmatory Order on Supplement 1 to NUREG-0737, the licensee submitted a Summary Report and proposed a schedule for implementation by the completion of the 7th refueling outage about 4 years from now. The submittals were reviewed by the staff and a preimplementation audit was sent to the licensee noting a number of deficiencies. The licensee must now respond to the staff report.

QUESTION 14 ACCORDING TO PRELIMINARY INFORMATION PROVIDED BY THE NRC STAFF, THE LICENSEE HAS RESISTED NRC RECOMMENDATIONS TO IMPROVE THE RELIABILITY AND CAPACITY OF THE AUXILIARY FEEDWATER SYSTEM AT DAVIS-BESSE. IS THIS TRUE AND IF SO, WHY DID NRC NOT REQUIRE THAT IMPROVEMENTS BE MADE?

ANSWER

IN MODIFICATION OF OUR PREVIOUS RESPONSE, THE LICENSEE HAS INDICATED THAT STEPS HAVE BEEN TAKEN TO COMPLETE THE INSTALLATION OF THE NEW PUMP ON AN ACCELERATED SCHEDULE. THE LICENSEE'S TARGET IS TO COMPLETE THE WORK PRIOR TO RESTART.

QUESTION 16. According to a June 13, 1985 memorandum from William J. Dircks, Executive Director for Operations, to the Commission, the licensee failed to provide accurate information to the NRC about the Davis-Besse incident. The memorandum states: "It became clear that the initial written description of the event was incomplete and that a number of potentially important details were not included." What information was incomplete and what details were not included in the licensee's initial report to NRC? What is the reason for this failure and what, if any, reporting requirements were violated?

ANSWER.

As a supplement to our original response, Table 3.1 of NUREG-1154 provides a chronological sequence of events. A copy of NUREG-1154 is provided in Enclosure 3.

QUESTION 17. What actions will NRC require prior to restart of Davis-Besse. Specifically, will NRC require that the January 1985 license condition committing to an additional auxiliary feedwater pump be fulfilled prior to restart. If not, please explain why.

ANSWER.

On August 14, 1985, the staff requested Toledo Edison to submit, pursuant to 10 CFR 50.54(f), plans and programs to resolve staff concerns relating to this event. Included in these concerns is the need for a diverse AFW pump. The staff will consider the licensee's response prior to making a decision concerning restart of the Davis-Besse facility. We understand that the licensee is moving rapidly on the issue and expects to complete installation of the third pump prior to restart. A copy of the August 14, 1985 10 CFR 50.54(f) letter is provided in Enclosure 3.

QUESTION 18 LIST ALL PENDING REQUIREMENTS AND LICENSING ACTIONS RELATING TO SYSTEMS AND COMPONENTS INVOLVED IN THE DAVIS-BESSE EVENT.

ANSWER

IN MODIFICATION OF OUR PREVIOUS ANSWER THE FOLLOWING IS PROVIDED:

A. RELIEF VALVE/SAFETY VALVE TESTING, NUREG-0737, ITEM II.D.1. THERE WERE NO MODIFICATIONS NECESSARY ON THE PORV AS A RESULT OF THE EPRI TEST PROGRAM. MODIFICATIONS TO THE SAFETY VALVE (RELOCATION AND LOOP-SEAL) WERE COMPLETED IN 1982. REGARDING THE POST-IMPLEMENTATION REVIEW, THE LICENSEE HAS SUBMITTED THE REQUIRED TESTING REPORTS. THE LICENSEE HAS PARTIALLY RESPONDED TO OUR QUESTIONS AND A FULL RESPONSE IS EXPECTED IN THE NEAR FUTURE.

B. LICENSEE CONDITION 2.C.3(T) TO OPERATING LICENSE, NPF-3. THE LICENSEE IS REQUIRED TO INSTALL A NEW, STARTUP FEEDWATER PUMP BEFORE STARTUP FROM THE NEXT REFUELING OUTAGE. THE LICENSEE HAS ACCELERATED INSTALLATION OF THIS PUMP AND PRESENTLY ANTICIPATES COMPLETION PRIOR TO RESTART.

C. AFW SYSTEM TECHNICAL SPECIFICATIONS

THE LICENSEE HAS SUBMITTED PROPOSED TECHNICAL SPECIFICATIONS AS REQUIRED UNDER NUREG-0737, ITEM II.E.1.1. THESE HAVE BEEN REVIEWED AND CERTAIN CHANGES (INVOLVING THE FLOW VERIFICATION TEST AND THE TEST AND OPERATING PROCEDURES) HAVE BEEN REQUESTED BY THE STAFF. THE LICENSEE WILL PROVIDE A REVISED PROPOSAL BY THE END OF SEPTEMBER 1985.

D. DETAILED CONTROL ROOM DESIGN REVIEW SUMMARY REPORT

SUPPLEMENT 1 TO NUREG-0737 REQUIRED A DETAILED CONTROL ROOM DESIGN REVIEW (DCRDR) SUMMARY REPORT TO BE SUBMITTED.

THE SUMMARY REPORT HAS BEEN REVIEWED BY THE STAFF AND A LIST OF DEFICIENCIES SENT TO THE LICENSEE.

(ALSO SEE ANSWER TO QUESTION 11).

QUESTION 20. PLEASE PROVIDE THE FOLLOWING INFORMATION FOR EACH YEAR SINCE 1980:

(E) THE NUMBER OF ALL ENFORCEMENT ACTIONS INCLUDING A BRIEF DESCRIPTION OF THE ISSUES, THE SEVERITY CLASSIFICATION AND ANY FINE LEVIED.

ANSWER.

IN ADDITION TO THE ENFORCEMENT CASES LISTED IN OUR PREVIOUS RESPONSE, ANOTHER ENFORCEMENT ACTION WAS ISSUED TO DAVIS BESSE IN JULY, 1985. A NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTY IN THE AMOUNT OF $100,000 WAS ISSUED TO TOLEDO EDISON COMPANY ON JULY 12, 1985 FOR VIOLATIONS INVOLVING 1) THE FAILURE TO FOLLOW A PROCEDURE THAT REQUIRED RESPONSIBLE INDIVIDUALS TO BE NOTIFIED AT THE TIME THE SECURITY AND FIRE PROTECTION COMPUTER WAS SHUT DOWN, 2) THE FAILURE OF A NON-LICENSED OPERATOR TO MONITOR PIPING STATUS IN THE AUXILIARY FEEDWATER PUMP AREA BECAUSE HE WAS SLEEPING AND 3) THE FAILURE TO LIMIT THERMAL POWER AS REQUIRED BY TECHNICAL SPECIFICATIONS WHEN THE REACTOR COOLANT FLOW RATE DECREASED. THE LICENSEE PAID THIS PROPOSED CIVIL PENALTY ON AUGUST 12, 1985.

ENCLOSURE 2

UPDATES TO REPRESENTATIVE MARKEY'S QUESTIONS OF JUNE 27, 1985

QUESTION 7. At the beginning of the Davis-Besse incident on June 9, 1985, how many operators and which ones were in the control room? During the incident how many operators were outside the control room or stationed post, what were their titles, why did they leave the control room or stationed post, and specifically what actions were actually accomplished outside of the control room. In light of those actions that needed to be taken from outside the control room, is Davis-Besse meeting General Design Criterion 19 which states:

> "A control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions...."

ANSWER.

Updated information is provided, as follows:

An NRC investigating team was sent to the Davis-Besse plant to investigate the June 9, 1985, incident. The report of this team was issued in July 1985 as NUREG-1154, "Loss of Main and Auxiliary Feedwater Event at the Davis-Besse Plant on June 9, 1985." Detailed information regarding operator locations and

ACTIONS DURING THE EVENT IS PROVIDED IN CHAPTERS 3 AND 6 OF NUREG-1154, AND IS BRIEFLY SUMMARIZED BELOW.

AT THE TIME OF THE DAVIS-BESSE INCIDENT ON JUNE 9, 1985, THERE WERE 10 MEMBERS OF THE OPERATING SHIFT ON DUTY AT THE PLANT. THESE INDIVIDUALS ARE AS FOLLOWS:

1 SHIFT SUPERVISOR (LICENSED SENIOR OPERATOR)
1 ASSISTANT SHIFT SUPERVISOR (LICENSED SENIOR OPERATOR)
1 PRIMARY-SIDE OPERATOR (LICENSED OPERATOR)
1 SECONDARY-SIDE OPERATOR (LICENSED OPERATOR)
4 EQUIPMENT OPERATORS (UNLICENSED)
1 AUXILIARY OPERATOR (UNLICENSED)
1 ADMINISTRATIVE ASSISTANT

IN ADDITION TO THE REGULAR SHIFT MEMBERS NOTED ABOVE, A SHIFT TECHNICAL ADVISOR (STA) ALSO WAS PRESENT AT THE PLANT, BUT NOT AS A MEMBER OF THE SHIFT CREW. THE STA WORKS A 24-HOUR SHIFT AT DAVIS-BESSE AND IS TO BE AVAILABLE WITHIN 10 MINUTES TO PROVIDE ADVICE TO THE OPERATING CREW.

THE INCIDENT INITIATED AT 1:35 A.M. AT THAT TIME THE POSITIONING OF THE SHIFT PERSONNEL AND THE STA WAS AS FOLLOWS:

SHIFT SUPERVISOR - IN HIS OFFICE ADJACENT TO THE CONTROL ROOM.

QUESTION 7. (CONTINUED) -3-

ASSISTANT SHIFT SUPERVISOR - HAD JUST RETURNED TO THE CONTROL ROOM FROM THE KITCHEN.

PRIMARY-SIDE OPERATOR - AT THE OPERATOR'S DESK IN THE CONTROL ROOM.

SECONDARY-SIDE OPERATOR - IN THE KITCHEN ON A BREAK.

EQUIPMENT OPERATOR - IN THE KITCHEN ON A BREAK.

3 EQUIPMENT OPERATORS - AT STATIONS IN THE PLANT.

AUXILIARY OPERATOR - AT STATION IN THE PLANT.

ADMINISTRATIVE ASSISTANT - IN HER OFFICE ADJACENT TO THE CONTROL ROOM.

SHIFT TECHNICAL ADVISOR - ASLEEP IN THE QUARTERS PROVIDED FOR ON-DUTY STAS.

THE INCIDENT BEGAN WITH A TRIP OF THE NO. 1 MAIN FEEDWATER PUMP TURBINE. THE "WINDING DOWN" OF THE TURBINE AS IT DECREASED SPEED PROVIDED AN AUDIBLE SIGNAL TO SHIFT PERSONNEL THAT SOMETHING WAS NOT NORMAL. THE SHIFT SUPERVISOR AND THE ADMINISTRATIVE ASSISTANT IMMEDIATELY LEFT THEIR OFFICES AND ENTERED THE CONTROL room. The Secondary-Side Operator ran to his station in the control room. Two of the equipment operators proceeded directly to the control room and were joined there by a third equipment operator. The Administrative Assistant notified the STA of the incident by telephone. The STA arrived in the control room about 15 minutes after event initiation. Thus, at 1:35 A.M. when the incident began, the Assistant Shift Supervisor and the Primary-Side Operator were in the control room proper. Within seconds of the incident initiation, the Shift Supervisor, the Secondary-Side Operator and the Administrative Assistant were also in the control room. They were joined several minutes later by three of the equipment operators and about 15 minutes later by the Shift Technical Advisor.

About 30 seconds after the trip of the No. 1 main feedwater pump turbine, both of the main steam isolation valves closed. This shut off the steam supply to both of the main feedwater pump turbines and the No. 2 main feedwater pump turbine began to coast down. However, it still provided adequate feedwater flow for another 4½ minutes. The operators then took action to place the auxiliary feedwater pumps in service, but both pump turbines tripped on overspeed. Also, the auxiliary feedwater system containment isolation valves failed to re-open after being inadvertently closed due to an operator error.

AFTER DELIBERATING THIS PROBLEM FOR SEVERAL MINUTES, AT ABOUT 9 MINUTES INTO THE INCIDENT, TWO OF THE EQUIPMENT OPERATORS WERE SENT TO THE AUXILIARY FEEDWATER PUMPS TO MANUALLY RESTORE THE PUMPS TO SERVICE; TWO OTHER EQUIPMENT OPERATORS WERE DIRECTED TO MANUALLY OPEN THE AUXILIARY FEEDWATER ISOLATION VALVES; AND THE AUXILIARY OPERATOR WAS DIRECTED TO PLACE THE AUXILIARY STEAM BOILER IN SERVICE. AT THIS SAME TIME, THE ASSISTANT SHIFT SUPERVISOR LEFT THE CONTROL ROOM TO PLACE THE START-UP FEEDWATER PUMP IN SERVICE.

AT ABOUT 16 MINUTES INTO THE INCIDENT, THE START-UP FEEDWATER PUMP BEGAN SUPPLYING FEEDWATER. TWO MINUTES LATER, THE NO. 2 AUXILIARY FEEDWATER TRAIN BEGAN SUPPLYING FEEDWATER, FOLLOWED 1 MINUTE LATER BY THE NO. 1 AUXILIARY FEEDWATER TRAIN. CONTROL OF THE NO. 2 AUXILIARY FEEDWATER PUMP WAS TAKEN OVER BY THE CONTROL ROOM UNDER MANUAL CONTROL RATHER THAN AUTOMATIC. THE NO. 1 AUXILIARY FEEDWATER PUMP WAS OPERATED LOCALLY BY THE EQUIPMENT OPERATORS WHO WERE IN COMMUNICATION WITH THE CONTROL ROOM. BY 2:04 A.M., ABOUT 30 MINUTES AFTER THE INITIATION OF THE INCIDENT, THE PLANT CONDITIONS WERE ESSENTIALLY STABLE.

THE STAFF EVALUATION OF THE INCIDENT AND THE ADEQUACY OF THE CONTROL ROOM INSTRUMENTATION AND CONTROLS HAS NOT YET BEEN COMPLETED. THUS, WE ARE UNABLE AT THIS TIME TO PROVIDE A DEFINITIVE RESPONSE REGARDING WHETHER OR NOT DAVIS-BESSE MEETS

GENERAL DESIGN CRITERION 19. HOWEVER, THE PRELIMINARY STAFF EVALUATION IS THAT DAVIS-BESSE IS IN CONFORMANCE WITH GDC 19. THE DIFFICULTIES EXPERIENCED DURING RESPONSE TO THE INCIDENT APPEAR TO HAVE BEEN DUE TO OPERATOR ERROR, BASIC HUMAN FACTORS DEFICIENCIES IN THE CONTROL ROOM DESIGN, AND EQUIPMENT MALFUNCTIONS.

QUESTION 8. ACCORDING TO THE NRC STAFF, FEED AND BLEED PROCEDURES FOR EMERGENCY COOLING WERE INITIATED DURING THE DAVIS-BESSE INCIDENT. NUMEROUS NRC MEMORANDA STATE THAT FEED AND BLEED EMERGENCY COOLING IS NOT CAPABLE OF AVERTING CORE DAMAGE AT DAVIS-BESSE. WHY THEN ARE FEED AND BLEED PROCEDURES PART OF THE NRC APPROVED EMERGENCY OPERATING PROCEDURES FOR THIS PLANT? IN RESPONDING TO THIS QUESTION, PLEASE STATE WHETHER SUCH A PROCEDURE WOULD LENGTHEN THE TIME BEFORE CORE UNCOVERING AND DAMAGE (AND IS SO BY HOW MUCH) AND WHETHER UNDERTAKING SUCH AN EFFORT IS DESIRABLE GIVEN OTHER PRIORITIES FACING THE OPERATORS.

ANSWER.

SUPPLEMENTAL INFORMATION

AS NOTED IN OUR PREVIOUS ANSWER, THE FEED AND BLEED COOLING MODE IS A BACKUP MEASURE, AVAILABLE TO PLANT OPERATORS, TO KEEP THE CORE COOLED WHILE MEASURES ARE TAKEN TO RESTORE FEEDWATER. THE PREVIOUS RESPONSE ALSO STATED THAT THE LIMITED MAKEUP PUMP FLOW AT DAVIS-BESSE WOULD AT LEAST HAVE SUBSTANTIALLY EXTENDED THE TIME BEFORE CORE DAMAGE WOULD OCCUR.

AS NOTED IN OUR SUPPLEMENTAL RESPONSE TO QUESTION 3 TO THE JUNE 17, 1985 RESPONSES, COMPUTER CALCULATIONS INDICATE THAT DAVIS-BESSE WOULD HAVE STARTED TO UNCOVER THE CORE IN APPROXIMATELY EIGHTY MINUTES IF FEEDWATER WAS NEVER RECOVERED AND NO MITIGATIVE OPERATOR ACTION WAS TAKEN. IN CONTRAST, THE COMPUTER CALCULATIONS DOCUMENTED IN THE ATTACHED DRAFT REPORT ENTITLED "RAPID-RESPONSE ANALYSIS OF THE DAVIS-BESSE LOSS-OF-FEEDWATER EVENT OF JUNE 9, 1985" SHOWS THAT MAINTAINING FLOW FROM JUST ONE MAKEUP PUMP DELAYS CORE UNCOVERY UNTIL APPROXIMATELY TWO AND ONE-HALF (2½) HOURS. BASED ON THAT ANALYSIS, WE JUDGE THAT ESTABLISHMENT OF FLOW FROM BOTH MAKEUP PUMPS WOULD HAVE PREVENTED CORE UNCOVERY.

THUS, THE STAFF HAS CONCLUDED THAT INCLUSION OF THE FEED AND BLEED MODE OF CORE COOLING IN THE EMERGENCY PROCEDURES IS PRUDENT AND EXPECTED TO BE SUCCESSFUL IF INITIATED IN A TIMELY MANNER. WE ALSO BELIEVE THAT IMPLEMENTATION OF FEED AND BLEED DOES NOT PLACE AN UNDUE BURDEN ON THE OPERATORS BECAUSE THE OPERATOR ACTIONS ARE SIMPLE TO INITIATE AND CAN BE READILY PERFORMED FROM THE CONTROL ROOM.

ADDITIONAL STAFF COMMENTS ON OUR PREVIOUS RESPONSE ARE AS FOLLOWS:

<ins>Question 8</ins>. Continued

A) The first sentence of the first paragraph on page 4 of the response to question 8 should be clarified to read:

"Plant-specific technical guidelines (based on generic guidelines) for writing emergency procedures have been developed by Toledo Edison Company based on the analyses described above."

B) As discussed in the response to question 8, the review of plant-specific guidelines as part of the procedures generation package for Davis-Besse is progressing but no new milestones have been reached. As is the case of all procedures generation packages for operating B&W plants, the guidelines for Davis-Besse have been authorized for implementation prior to completion of formal staff review (NUREG-0737, Supplement No. 1, Section 7.2.b). The staff review is scheduled for completion by May 30, 1986.

It should be noted that feed and bleed was not initiated during the June 9 event. This is discussed in Section 6 of NUREG-1154.

QUESTION 9. GIVEN THE DEMONSTRATED LIKELIHOOD OF A TOTAL LOSS OF FEEDWATER AT B&W REACTORS, WHY DOES THE NRC CONSIDER THIS TYPE OF INCIDENT TO BE BEYOND THE DESIGN BASIS? WHAT IS THE TECHNICAL BASIS FOR CONSIDERING A POTENTIAL FAILURE OR ACCIDENT SEQUENCE AS A DESIGN BASIS EVENT?

ANSWER.

SUPPLEMENTAL INFORMATION IS PROVIDED, AS FOLLOWS:

IN NUREG-1154, "LOSS OF MAIN AND AUXILIARY FEEDWATER EVENT AT THE DAVIS-BESSE PLANT ON JUNE 9, 1985," SEVERAL ITEMS ARE IDENTIFIED AS CONTRIBUTING TO THE TOTAL LOSS OF AUXILIARY FEEDWATER. THESE ARE:

1. OPERATOR ERROR INVOLVING MANUAL INITIATION OF THE STEAM AND FEEDWATER LINE RUPTURE CONTROL SYSTEM (SFRCS). THIS ERROR, WHICH WAS THE RESULT OF THE OPERATOR INADVERTENTLY PUSHING THE WRONG TWO BUTTONS, RESULTED IN THE ISOLATION OF AUXILIARY FEEDWATER TO BOTH STEAM GENERATORS.

2. FAILURE OF THE AUXILIARY FEEDWATER ISOLATION VALVES TO OPEN AFTER THE OPERATOR ERROR DESCRIBED ABOVE WAS CORRECTED. THIS RESULTED IN THE NEED TO LOCALLY OPEN THE ISOLATION VALVES LATER IN THE EVENT IN ORDER TO RESTORE FEEDWATER.

QUESTION 10. LIST EVERY REGULATION, REQUIREMENT, RECOMMENDATION, GENERAL DESIGN CRITERIA, STANDARD REVIEW PLAN ITEM, BRANCH TECHNICAL POSITION, CONFIRMATORY ACTION LETTER ITEM, LICENSING COMMITMENT, TMI ACTION PLAN ITEM, NUREG-0667 RECOMMENDATION, OR ANY OTHER ITEM THAT DAVIS-BESSE WAS NOT IN FULL AND COMPLETE COMPLIANCE WITH ON JUNE 9, 1985.

ANSWER.

SUPPLEMENTAL INFORMATION IS PROVIDED, AS FOLLOWS:

AS STATED IN THE DAVIS BESSE SER THE STAFF BELIEVED, AT THE TIME OF LICENSING, THAT THE TWO AUXILIARY FEEDWATER TRAINS WERE CAPABLE OF SUSTAINING A SINGLE ACTIVE FAILURE. SUBSEQUENTLY, AS A RESULT OF THE NRC INVESTIGATIVE TEAM'S REPORT, NUREG-1154, THE STAFF WAS MADE AWARE THAT THE CONCLUSION REACHED REGARDING THE SINGLE FAILURE CAPABILITY IS NOT INCLUSIVELY TRUE. THE TEAM FOUND THAT THE STEAM AND FEEDWATER LINE RUPTURE CONTROL SYSTEM (SFRCS) INTERACTION WITH THE AUXILIARY FEEDWATER (AFW) SYSTEM DOES NOT MEET THE SINGLE FAILURE CRITERION AND IS NOT IN COMPLIANCE WITH GENERAL DESIGN CRITERION (GDC) 34 AS DEFINED BY THE CURRENT STANDARD REVIEW PLAN (SRP) SECTION 10.4.9. SPECIFICALLY, IN THE EVENT OF A STEAM LINE BREAK, A SINGLE FAILURE WITHIN THE SFRCS OR IN THE AFW SYSTEM (MOTOR OPERATED CONTAINMENT ISOLATION VALVE FAILS TO OPEN), COULD RESULT IN THE FAILURE TO DELIVER AFW TO THE INTACT STEAM GENERATOR.

It should be noted that at the time of Licensing GDC-34 as defined by the current SRP Section 10.4.9 did not apply to the AFW system at B&W operating plants as the AFW system was not considered/required to be a safety related system. Compliance with GDC-34 is not currently a requirement for AFW systems at operating plants, including Davis-Besse, because it has not been backfitted. However, in the safety evaluation report for the operating license review of Davis-Besse, the AFW system was reviewed to single active failure criteria because the licensee had installed a safety grade AFW system even though they were not required to do so. In either case, the licensee is proposing to make modifications to the SFRCS system to eliminate the potential for single failure which has been identified.

QUESTION 15. AFTER CONCERNS WERE RAISED BY COMMISSIONER GILINSKY AND THEN REGION III IN 1983, TOLEDO EDISON PLEDGED TO TAKE STEPS TO IMPROVE ITS REGULATORY PERFORMANCE AND MANAGEMENT. ACCORDING TO THE NRC STAFF, THESE MEASURES WERE INEFFECTIVE. WHY DIDN'T THE NRC TAKE ACTION TO REQUIRE EFFECTIVE IMPROVEMENTS AND HAS THE NRC DETERMINED WHY THOSE ACTIONS THAT WERE TAKEN WERE NOT EFFECTIVE? ADDITIONALLY, WHAT MEASURES DOES THE COMMISSION PLAN TO TAKE NOW TO ASSURE REGULATORY AND MANAGEMENT IMPROVEMENTS AND HOW WILL THEY DIFFER FROM THOSE TAKEN OVER THE PAST TWO YEARS?

ANSWER.

SUPPLEMENTAL INFORMATION IS PROVIDED, AS FOLLOWS:

IN JULY 1985, A PROPOSED CIVIL PENALTY OF $100,000 WAS ISSUED TO TECO AS A RESULT OF CONTINUING NRC CONCERNS WITH INTERNAL COMMUNICATION PROBLEMS AT TED AND LACK OF PROMPT IDENTIFICATION AND CORRECTION OF REGULATORY PROBLEMS. THE LICENSEE PAID THIS CIVIL PENALTY ON AUGUST 12, 1985.

MORE DETAILS REGARDING THIS ENFORCEMENT ACTION ARE PROVIDED IN THE UPDATED RESPONSE TO QUESTION NO. 20 OF YOUR JUNE 17, 1985 LETTER.

QUESTION 15. (CONTINUED -2-

NEW MANAGERS WERE ASSIGNED TO THE FOLLOWING POSITIONS TO EFFECT MANAGEMENT IMPROVEMENT AT THE DAVIS BESSE FACILITY. ALL WERE OBTAINED FROM OUTSIDE THE COMPANY AND HAVE NUCLEAR EXPERIENCE.

SENIOR VICE PRESIDENT, NUCLEAR
PLANT MANAGER
MAINTENANCE SUPERINTENDENT
PLANNING SUPERINTENDENT
INSTRUMENT AND CONTROL ENGINEER

REGION III WILL CONTINUE TO BE INVOLVED IN MONITORING THE NEW MANAGEMENT.

Question 18. Should cost-benefit analysis be used to decide whether to require Davis-Besse to install a third auxiliary feedwater pump when it does not meet the Standard Review Plan reliability and when no other U.S. reactor has the same design vulnerability of only two steam driven pumps?

Answer.

Since our response to the June 27 Question 18, a staff cost-benefit analysis of the desirability of adding a third, diverse pump train to the existing Davis-Besse two turbine-driven auxiliary feedwater trains has been completed. The analyses are summarized in the Executive Summary of the staff report (Memorandum for H. Denton from T. Speis, "Adequacy of the Auxiliary Feedwater System at Davis-Besse," July 23, 1985), see attached copy. Complete memo is in Enclosure 3.

Davis-Besse AFW Analysis

EXECUTIVE SUMMARY

The reliability of the auxiliary feedwater system at Davis-Besse, and its effect on core melt frequency and public risk, have been examined using the techniques of probabilistic analysis. In particular, the desirability of adding a third, diverse (i.e. motor-driven) train to the two existing turbine-driven trains was investigated.

There is no PRA available for the Davis-Besse plant. Therefore, PRA calculations for Oconee 3 were adapted for the Davis-Besse plant. Although all the usual uncertainties of PRA are present, it appears that the addition of a third, diverse train would avert roughly 10^{-4} core melts per year. Cost effectiveness over the remaining life of the plant appears to be in the range of 100 to 400 dollars per person-rem averted.

In terms of reduction of core melt frequency, the addition of a third train is highly desirable, particularly since the PRA analysis is based largely on generic data. The large number of LERs on file for the Davis-Besse auxiliary feedwater system suggests that the analysis of the present situation may well be overly optimistic. This would make a third train still more valuable, and implies that some upgrading of two existing trains might be in order.

In terms of cost effectiveness, the addition of a third train appears to be quite cost effective, but the decision is not absolutely clear because of the uncertainties involved. However, this analysis considered only two, somewhat hypothetical designs. It is likely that a still more cost-effective system could be designed.

In summary, the addition of a third train of auxiliary feedwater at Davis-Besse appears to be justified.

ENCLOSURE 3

1. NUREG-1154, LOSS OF MAIN AND AUXILIARY FEEDWATER EVENT AT THE DAVIS-BESSE PLANT
2. TITLE 10 CFR 50.54(F) LETTER FROM H. DENTON TO TOLEDO EDISON, DATED AUGUST 14, 1985
3. MEMO; SHORT TERM GENERIC ACTIONS AS A RESULT OF THE DAVIS-BESSE EVENT, H. THOMPSON, JR. TO T. SPEIS, AUGUST 19, 1985
4. MEMO; ADEQUACY OF THE AUXILIARY FEEDWATER SYSTEM AT DAVIS BESSE, T. SPEIS TO H. DENTON, JULY 23, 1985
5. REPORT; RAPID RESPONSE ANALYSIS OF THE DAVIS-BESSE LOSS-OF-FEEDWATER EVENT ON JUNE 9, 1985

NINETY-NINTH CONGRESS

EDWARD J. MARKEY, MASSACHUSETTS, CHAIRMAN

AL SWIFT, WASHINGTON
JOHN BRYANT, TEXAS
MICKEY LELAND, TEXAS
RICHARD C. SHELBY, ALABAMA
RON WYDEN, OREGON
RALPH M. HALL, TEXAS
DENNIS E. ECKART, OHIO
GERRY SIKORSKI, MINNESOTA
JOHN D. DINGELL, MICHIGAN
(EX OFFICIO)

CARLOS J. MOORHEAD, CALIFORNIA
MICHAEL G. OXLEY, OHIO
HOWARD C. NIELSON, UTAH
MICHAEL BILIRAKIS, FLORIDA
FRED J. ECKERT, NEW YORK
JAMES T. BROYHILL, NORTH CAROLINA
(EX OFFICIO)

LAWRENCE R. SIDMAN
CHIEF COUNSEL AND STAFF DIRECTOR

U.S. HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON ENERGY CONSERVATION
AND POWER
OF THE
COMMITTEE ON ENERGY AND COMMERCE
WASHINGTON, DC 20515

ROOM H2-316
HOUSE OFFICE BUILDING ANNEX NO. 2
PHONE (202) 226-[illegible]

September 20, 1985

The Honorable Nunzio J. Palladino
Chairman
U.S. Nuclear Regulatory Commission
1717 H Street, N.W.
Washington, D.C. 20555

Dear Mr. Chairman:

This is to request certain documents in preparation for the Subcommittee's upcoming hearing on the Davis-Besse incident.

Please provide the Subcommittee with the following: (1) all documents generated in response to William J. Dircks' August 5, 1985 memorandum to the NRC staff regarding staff actions in response to the Davis-Besse incident; (2) a copy of Mr. Dircks' September 5, 1985 memorandum to the Commission regarding staff actions in response to the Davis-Besse incident and all documents mentioned therein, leading to, or generated in response to his memorandum; (3) all documents leading to or resulting from Mr. Dircks' August 5, 1985 memorandum to Chairman Palladino concerning a review of operating reactors including all documents generated in response to Hugh L. Thompson's June 26, 1985 memorandum to the Division of Licensing Project Managers.

Please provide the above requested documents to the Subcommittee by 12:00 noon on Wednesday, September 24, 1985. The Commission's prompt assistance is appreciated.

Sincerely,

Ed Markey
Edward J. Markey
Chairman

EJM:mw

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

OFFICE OF THE
CHAIRMAN

September 25, 1985

The Honorable Edward J. Markey, Chairman
Subcommittee on Energy Conservation and Power
Committee on Energy and Commerce
United States House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is an initial response to your letter of September 20, 1985. We are currently polling NRC offices to collect the documents that are responsive to your request.

The attached documents are mostly predecisional memoranda which would be withholdable by the Commission in response to a Freedom of Information Act request and which represent the candid provision of views in the agency's decisional process. For these reasons, we ask that the documents be held in confidence and disseminated to the Members and staff of the Subcommittee only on a need to know basis. In the short time that you have given for a response, our Office of the General Counsel has not been able to perform a detailed review to determine whether there may be some exceptions.

Commissioner Asselstine adds that documents that he originated need not be held in confidence.

Sincerely,

Thomas M. Roberts
Acting Chairman

Enclosures:
As stated above

cc: The Honorable Carlos J. Moorhead

RESPONSES PROVIDED BY SECRETARIAT

1. 9/5/85 Memorandum from Mr. W. J. Dircks to Chairman Palladino and Commissioners Roberts, Asselstine, Bernthal and Zech
SUBJECT: FURTHER NRC ACTIONS ON DAVIS-BESSE

2. 8/5/85 Memorandum from Mr. W. J. Dircks to Chairman Palladino
SUBJECT: REVIEW OF OPERATING NUCLEAR POWER PLANTS

3. 8/5/85 Memorandum from Mr. W. J. Dircks to Mr. H. R. Denton, et. al.
SUBJECT: STAFF ACTIONS RESULTING FROM THE INVESTIGATION OF THE JUNE 9 DAVIS-BESSE EVENT (NUREG-1154)

RESPONSES PROVIDED BY COMMISSIONER ASSELSTINE

1. 9/19/85 Memorandum from Commissioner Asselstine to Mr. D. A. Ward, ACRS
SUBJECT: JUNE 9, 1985 EVENT AT DAVIS BESSE

2. 9/18/85 Memorandum from Commissioner Zech to Mr. S. J. Chilk
SUBJECT: COMJA-85-11 AND RESPONSES

3. 9/16/85 Memorandum from Mr. B. Paul Cotter, Jr. to Chairman Palladino
SUBJECT: USE OF PANEL MEMBERS ON BOARDS OF INQUIRY IN THE CONTEXT OF AN INCIDENT RESPONSE PROCESS

4. 9/9/85 Memorandum from Commissioner Roberts to Mr. S. J. Chilk
SUBJECT: FURTHER NRC ACTIONS ON DAVIS BESSE (COMJA-85-11)

5. 9/6/85 Memorandum from Mr. B. Paul Cotter, Jr. to Chairman Palladino
SUBJECT: USE OF PANEL MEMBERS ON BOARDS OF INQUIRY IN THE CONTEXT OF AN INCIDENT RESPONSE PROCESS

6. 9/5/85 Memorandum from Commissioner Asselstine to Chairman Palladino and Commissioners Roberts, Bernthal and Zech
SUBJECT: COMJA-85-11 AND RESPONSES

7. 8/30/85 Memorandum from Commissioner Zech to Mr. S. J. Chilk
SUBJECT: COMJA-85-11 - FURTHER NRC ACTIONS ON DAVIS BESSE

8. 8/28/85 Memorandum from Chairman Palladino to Commissioner Asselstine
SUBJECT: RESPONSE TO COMJA-85-11

9. 8/27/85 Memorandum from Chairman Palladino to Mr. W. J. Dircks, EDO
SUBJECT: FOLLOW-UP ACTIONS ON OPERATING PLANTS OTHER THAN DAVIS BESSE

10. 8/16/85 Memorandum from Commissioner Asselstine to Chairman Palladino and Commissioners Roberts, Bernthal and Zech
SUBJECT: FURTHER NRC ACTIONS ON DAVIS BESSE

RESPONSES PROVIDED BY COMMISSIONER ROBERTS

1. 9/11/85 Memorandum from Commissioner Roberts to Mr. S. J. Chilk
SUBJECT: COMJA-85-11 AND RESPONSES (COMJA-85-11A)

2. 9/9/85 Memorandum from Commissioner Roberts to Mr. S. J. Chilk
SUBJECT: FURTHER NRC ACTIONS ON DAVIS BESSE (COMJA-85-11)

RESPONSES PROVIDED BY CHAIRMAN PALLADINO

1. 8/28/85 Memorandum from Chairman Palladino to Commissioner Asselstine
SUBJECT: RESPONSE TO COMJA-85-11

2. 8/27/85 Memorandum from Chairman Palladino to Mr. W. J. Dircks, EDO
SUBJECT: FOLLOW-UP ACTIONS ON OPERATING PLANTS OTHER THAN DAVIS-BESSE

3. 6/27/85 Memorandum from Chairman Palladino to Mr. W. J. Dircks, EDO
SUBJECT: REVIEW OF OPERATING NUCLEAR POWER PLANTS

CHAIRMAN

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

September 30, 1985

RECEIVED
OCT 2 1985
Energy Conservation and Power

The Honorable Edward Markey, Chairman
Subcommittee on Energy Conservation and Power
Committee on Energy and Commerce
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Enclosed are documents related to your September 20, 1985 request concerning the Nuclear Regulatory Commission's response to the June 9, 1985 Davis-Besse incident. Please note that the documents are complete for the Office of Nuclear Reactor Regulation. Documents from the Office of Inspection and Enforcement and the Region III Office will be forwarded upon receipt.

A preliminary review has yielded several documents which should be withheld from public disclosure. We are currently reviewing all the attached documents to determine if any additional ones should be withheld. We will complete our review by October 1, 1985. It is therefore requested that you hold all the attached documents from public disclosure until we can inform you of the results of our review.

Sincerely,

Nunzio J Palladino

Nunzio J. Palladino
Chairman

Enclosures:
NRR Documents Related to 9/20/85 Response
from the Subcommittee on Energy
Conservation and Power

cc: Rep. Carlos Moorhead

List of documents provided in response to Markey letter of 9/20/85

Package #1

Toledo Edison Company - Davis Besse Nuclear Power Station Course of Action Report dated 9/9/85 Volumes 1 and 2

August 5 Memo fm Dircks to Denton, Taylor, Minogue, Heltemes and Keppler re: STAFF ACTIONS RESULTING FROM THE INVESTIGATION OF THE JUNE 9 DAVIS-BESSE EVENT ([illegible]EG-1154)

August 5 Generic Letter re: TRANSMITTAL OF NUREG-1154 REGARDING THE DAVIS-BESSE LOSS OF MAIN AND AUXILIARY FEEDWATER EVENT (Generic Letter No. 85-13)

August 5 Memo fm Crutchfield to Hugh Thompson re POTENTIAL IMMEDIATE GENERIC ACTIONS AS A RESULT OF THE DAVIS-BESSE EVENT OF JUNE 9, 1985

August 8 Memo fm William Russell to Darrell Eisenhut re MAINTENANCE SURVEY AT DAVIS-BESSE

August 13 Memo fm Frank Rowsome to Gus Lainas and Dennis Crutchfield re DAVIS-BESSE RESTART CONSIDERATIONS

August 14 Letter to Toledo Edison Company fm James Keppler

August 14 Letter to Toledo Edison Company fm Harold Denton

August 16 Memo to John Stolz fm Albert De Agazio re FORTHCOMING SITE VISIT TO DAVIS-BESSE

August 19 Memo to Themis Speis fm Hugh Thompson re SHORT TERM GENERIC ACTIONS AS A RESULT OF THE DAVIS-BESSE EVENT OF JUNE 9, 1985

August 19 Memo to Hugh Thompson fm Themis Speis re DAVIS-BESSE EVENT - POTENTIAL THERMAL STRESS CONCERN

August 19 Memo to William Dircks fm H. Denton re: NRR INITIATIVES RESULTING FROM THE DAVIS-BESSE EVENT

August 21 Memo to R. Bernero, J. Knight, W. Russell, T. Speis fm Hugh Thompson re NRR DRAFT ACTION PLAN RESULTING FROM THE DAVIS-BESSE JUNE 9, 1985 EVENT

August 21 Memo to John Stolz fm Albert W. DeAgazio re FORTHCOMING MEETING WITH TOLEDO EDISON COMPANY

Transcript of Meeting with Toledo Edison Company September 4 Meeting with NRC Staff

August 27 Memo to C. J. Heltemes and H. R. Denton fm John Davis re STAFF ACTIONS RESULTING FROMTHE INVESTIGATION OF THE JUNE 9 DAVIS-BESSE EVENT (NUREG-1154)

August 29 Memo to R. Bernero, J. Knight, W. Russell, T. Speis fm Hugh Thompson re NRR DRAFT ACTION PLAN RESULTING FROM THE DAVIS-BESSE JUNE 9, 1985 EVENT

August 29 Memo to F. Cherny fm F. Rosa re TOLEDO EDISON/DAVIS BESSE JUNE 9 1985 EVENT: TAC#59422 - ICSB INPUT

August 29 Memo to O. Parr fm F. Rosa re TOLEDO EDISON/DAVIS BESSE: ACTION PLAN #8 (REV 4) FOR MAINFEED PUMP CONTROL SYSTEM: FINDINGS REPORT (REV. 0) TAC #59421 - ICSB INPUT

August 29 Memo to Gus Lainas fm L. Rubenstein re EVALUATION OF DAVIS-BESSE AFPT OVERSPEED TRIP THROTTLE VALVE CORRECTIVE ACTIONS AND GENERIC IMPLICATIONS REPORT - AUXILIARY SYSTEMS BRANCH - TAC NUMBER 59418

August 30 Memo to R. Bernero, J. Knight, W. Russell, T. Speis fm H. Thompson re NRR REVIEW PLAN ANC ASSIGNMENTS

August 30 Memo to G. Lainas fm R. Wayne Houston re DAVIS BESSE/TOLEDO EDISON - ACTION PLAN #18 (REV. 1) STARTUP FEEDWATER VALVE SP-7A PROBLEM ANALYSIS: CORRECTIVE ACTIONS AND GENERIC IMPLICATIONS REPORT (REV. 0)

September 4 Memo to W. Dircks fm C. J. Heltemes re STAFF ACTIONS RESULTING FROM THE INVESTIGATION OF THE JUNE 9, 1985 DAVIS BESSE EVENT

September 4, 1985 Memo to T. Speis, R. Bernero, J. Knight W. Russell fm Hugh Thompson re DRAFT LIST OF LONGER-TERM GENERIC ACTIONS AS A RESULT OF THE DAVIS-BESSE EVENT OF JUNE 9, 1985

September 6 Memo to R. Bernero, J. Knight, W. Russell, T. Speis fm H. Thompson re NRR DRAFT ACTION PLAN RESULTING FROM THE DAVIS-BESSE JUNE 9, 1985 EVENT - REVISION 2

September 9 Memo to Bernero, Knight, Russell, Speis fm Thompson re RETROSPECTIVE LOOK AT NRR PROGRAMS AS A RESULT OF THE DAVIS-BESSE EVENT

September 9 Memo to Gus Lainas fm L. Rubenstein re EVALUTION OF DAVIS BESSE MAIN FEED PUMP TURBINE AND CONTROL SYSTEM FAILURE - AUXILIARY SYSTEMS BRANCH - TAC NUMBER 59421

September 11 Memo to H. Thompson fm G. Lainas and J. Stolz re RECOMMENDATION FOR LONGER TERM GENERIC ACTION AS A RESULT OF DAVIS-BESSE EVENT OF JUNE 9, 1985

September 11 Memo to H. Thompson, T. Speis, R. Bernero, J. Knight and W. Russell fm H. Denton re LESSONS LEARNED FROM THE DAVIS BESSE INVESTIGATION EFFORT

September 16 Memo to T. Speis fm H. Thompson re CONCERNS RELATED TO THE DAVIS BESSE INCIDENT ON JUNE 9, 1985

Package #2

August 5 Memo to Chairman Palladino fm Dircks re REVIEW OF OPERATING NUCLEAR POWER PLANTS

August 16 Memo to Commission fm Commissioner Asselstine re FURTHER NRC ACTIONS ON DAVIS BESSE

August 19 Memo to W. Dircks fm H. Denton re NRR INITIATIVES RESULTING FROM THE DAVIS BESSE EVENT

August 21 Memo to Bernero, Knight, Russell, Speis fm Thompson re: NRR DRAFT ACTION PLAN RESULTING FROM THE DAVIS BESSE JUNE 9, 1985 EVENT

August 29 Memo to Bernero, Knight, Russell, Speis fm Thompson re NRR DRAFT ACTION PLAN RESULTING FROM THE DAVIS BESSE JUNE 9, 1985 EVENT

August 29 Note to D. Eisenhut, R. Bernero, T. Speis fm G. Holahan

August 29 Memo to W. Dircks fm J. Keppler re REGION III INITIATIVES RESULTING FROM THE DAVIS-BESSE EVENT

August 30 Memo to S. Chilk fm Zech re COMJA-85-11 - FURTHER NRC ACTIONS ON DAVIS BESSE

September 3 Memo to W. Dircks fm Taylor re STAFF ACTIONS RESULTING FROM THE INVESTIGATION OF THE JUNE 9 DAVIS BESSE EVENT (NUREG-1154)

September 4 Memo to W. Dircks fm C. Heltemes re STAFF ACTIONS RESULTING FROM THE INVESTIGATION OF THE JUNE 9, 1985 DAVIS-BESSE EVENT

September 5 Memo to Commission fm W. Dircks re FURTHER NRC ACTIONS ON DAVIS BESSE

Package #3

August 4 Memo to Chairman Palladino fm W. Dircks re REVIEW OF OPERATING NUCLEAR POWER PLANTS

July 19 Memo to H. Thompson fm E. Butcher re OPERATING REACTORS PROJECT MANAGER SURVEY RESPONSE FOR FORT ST. VRAIN

July 19 Memo to H. Thompson fm G. Lainas RE: BROWNS FERRY SAFETY ISSUES

July 23 Memo to H. Thompson fm G. Lainas re: RANCHO SECO - OPERATIONAL PROBLEMS

July 23 Note to H. Thompson fm John Zwolinski re LICENSING ISSUES FOR SAN ONOFRE 1 AND PALISADES

August 27 Memo to W. Dircks fm Palladino re FOLLOW-UP ACTIONS ON OPERATING PLANTS OTHER THAN DAVIS BESSE

June 26 Memo to Division of Licensing Project Managers fm H. Thompson re OPERATING REACTORS PROJECT MANAGER SURVEY

ORPM SURVEY sheets

September 17 Memo to Chairman Palladino fm W. Dircks re FOLLOW-UP ACTIONS ON OPERATING PLANTS OTHER THAN DAVIS BESSE

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

AUG 0 5 1985

MEMORANDUM FOR: Chairman Palladino

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: REVIEW OF OPERATING NUCLEAR POWER PLANTS

As a result of the recent incident at Davis-Besse, on June 27, 1985 you asked the staff to identify any other operating nuclear power plants with specific features that need to be modified or added where the required corrective action has been outstanding for an extended period of time. Prior to receipt of your request the Director of NRR had directed that a survey be made to identify any other long standing situations. Operating reactor project managers (PMs) were requested to report any safety-related systems or systems important to safety for which there are questions or concerns with respect to design, performance or reliability at their plants (Enclosure 1). Additional inputs were solicited from the NRR technical divisions and the Regions.

In addition to Davis-Besse, four facilities, Browns Ferry, Ft. St. Vrain, Rancho Seco and San Onofre 1, have been identified as having issues to which the staff is paying increased attention. While none of the issues has been identified as having high safety priority, the overall numbers of issues or the recent operational problems at these plants is cause for concern. One plant, Palisades, has a single issue (main steam line break coupled with the failure of an MSIV) which the staff feels is of importance and corrective action has been outstanding for an extended period of time. The Director of NRR has directed that monthly status reports be provided to him on these six facilities. A discussion of the above plants is given in Enclosure 2.

The responses received also identified generic issues that have been difficult to resolve. Two issues (Containment Purge and Vent and Fire Protection) were identified by the project managers as having taken a longer time to resolve than desired. A discussion of these two issues is included in Enclosure 2 and monthly status reports on these issues will be provided to the Director of

CONTACT:
J. Lyons, NRR
Ext. 28285

NRR. Two other generic issues of lesser safety significance, identified by the project managers as being long outstanding, are Inservice Testing and Inadequate Core Cooling Instrumentation. The technical divisions identified the lack of PORVs on certain CE plants. This issue has been incorporated into the comprehensive studies underway to resolve USI A-45, Decay Heat Removal Capability, as discussed with the Commission previously.

In summary, the staff has reevaluated the long outstanding issues on operating nuclear power plants to determine if there are specific features that require immediate action by NRC. While no specific features were identified, there are some areas which the staff has been paying closer attention to, as discussed above. The staff is continuing their initiatives to resolve these issues in a timely manner.

(Signed) William J. Dircks

William J. Dircks
Executive Director for Operations

Enclosures:
As stated

cc: Comm. Roberts
Comm. Asselstine
Comm. Bernthal
Comm. Zech
OPE
OGC
SECY

Distribution:
WDircks PDR
JRoe
TRehm
VStello
JTaylor
GCunninghem
Regions I-V
MBridgers
HDenton
DEisenhut
HThompson
PPAS
LMulley (000766)

	DL	ONRR	ONRR	EDO
JLyons:mcs	HThompson	DEisenhut	HRDenton	WJDircks
7/30/85	7/30/85	7/ /85	7/31/85	7/ /85

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 2 6 1985

MEMORANDUM FOR: Division of Licensing Project Managers

FROM: Hugh L. Thompson, Jr., Director
Division of Licensing

SUBJECT: OPERATING REACTORS PROJECT MANAGER SURVEY

One of the results of reviewing the recent incident involving the feedwater systems at Davis-Besse is the importance of periodically taking a broad overview of the regulatory issues that remain open at operating reactors. In order to ensure that management is aware of other long standing situations at operating reactors which have been difficult to resolve,I request that you provide your Branch Chief, by COB July 2, with an identification of any safety related systems or systems important to safety for which there are questions or concerns with respect to design, performance or reliability. In addition, please identify any recommendations for regulatory action that you consider safety significant and where significant dialogue between the staff and/or the licensee has taken place without adequate resolution being reached. Also identify any significant safety issues which you may be concerned about that have not been identified by the above. The attached survey form is provided for your response. A response is requested for each plant even if you believe no significant issues remain open. In this case please identify the three most important licensing actions under review. Handwritten responses are acceptable. If you need any additional information concerning this please contact your Branch Chief or myself.

Hugh L. Thompson, Jr.
Hugh L. Thompson, Jr., Director
Division of Licensing

Enclosure:
As Stated

cc: H. Denton
DL BCs
DL ADs
F. Miraglia

ORPM SURVEY

PLANT NAME____

PROJECT MANAGER____________________________________

1. Safety related systems or systams important to safety for which there are questions or concerns with respect to design, performance or reliability:

2. Safety significant regulatory actions where significant dialogue between the staff and/or the licensee has taken place without adequate resolution.

3. Any other significant safaty issues of concern.

4. The three most important licensing actions under review if none identified above.

ENCLOSURE 2

RESULTS OF ORPM SURVEY

Browns Ferry 1, 2, 3

As discussed in SECY 85-231, the staff has concerns about performance deficiences at Browns Ferry and the other TVA facilities as indicated by a sustained and consistent history of poor performance and from a number of more recent events. All Browns Ferry units are currently shut down and will not be restarted until TVA and the NRC are satisfied with the corrective actions being taken.

TVA's Nuclear Safety Review Staff (NSRS) issued an internal report on June 27, 1984 which raised concerns about the performance and reliability of the High Pressure Coolant Injection (HPCI) systems for each Browns Ferry unit. For several years, TVA has had a task force whose objective has been to improve HPCI system performance. Upon receipt of the report, Region II sent a special team of inspectors to Browns Ferry to independently evaluate the issue. Region II concluded that there were no violations or deviations. By letter dated April 26, 1985, the Honorable Morris K. Udall requested NRC comments on the NSRS report to which we responded by letter dated July 10, 1985. As stated therein, the HPCI systems at Browns Ferry do not represent an undue risk and the present situation does not preclude startup and operation of a unit. The situation does indicate that we closely scrutinize TVA's activities to resolve identified problems with the HPCI systems.

The fire at Browns Ferry in March 1975 identified the need for increased fire protection at Browns Ferry and other nuclear plants. Many modifications were made at Browns Ferry prior to approving restart of the units in August 1976. Subsequently, we evaluated all other operating plants; these safety evaluations were the basis for plant modifications to conform to Appendix R. Because Browns Ferry was not included in these subsequent evaluations, when Appendix R was issued, TVA needed more time than other licensees to determine what modifications were required. The proposed modifications are under review by NRC. The end result is that the fire protection modifications at Browns Ferry are not being implemented as soon as at many other facilities. With the compensatory measures that TVA has proposed, the delay in implementing these fire protection modifications does not pose a significant risk to public health and safety and should not preclude startup and operation of the Browns Ferry units while the modifications are in progress. It is, however, an issue that requires close scrutiny by NRC.

Browns Ferry has been very slow compared to other licensees in implementing some NRC-required modifications. The problem apparently stems from Browns Ferry's unique three-plants-under-one-roof physical layout, for which a high level of modification activity is difficult to plan and control. Most of the major, significant projects have been or will be completed prior to restart of the units (e.g., upgrading the integrity of the Mark I torus, environmental qualification of electrical equipment, modifications to the scram discharge system, etc.). The remaining modifications should not preclude startup or operation of the units but do warrant close scrutiny by NRC to ensure TVA is diligently pursuing implementation.

Browns Ferry has a history of excessive and recurring reportable events and enforcement actions. These items are attributed to human factors concerns (i.e., management overview, operator training, operator attitude, salary limitations, etc.). These problems are under NRC review for proposed long-term action. The licensee has committed the facilities to stay shutdown until capable of regulatory compliance. An NRC review team will evaluate Browns Ferry readiness-to-restart.

Fort St Vrain

A review of the list of open issues and ongoing safety reviews for Fort St. Vrain was conducted in response to H. Thompson's June 26, 1985 memorandum. The focus of the review was on determining the overall significance of the sum total of all the items identified and whether the July 1985 restart of the plant should be delayed because of these or any other ongoing safety reviews for the plant.

The specific items identified in response to the June 26, 1985 memorandum were originally identified in the staff's October 1984 Assessment Report and the last SALP evaluation. They are:

- Emergency Diesel Generators
- Firewater System (Safeguards Protection)
- Station Batteries
- Control Rod Drive Mechanisms
- Control Rod Position Instrumentation
- Helium Circulators
- Management Control
- Building 10 Construction
- Chlorides in Reactor
- Fire Protection (Appendix R)
- ISI/IST
- PCRV Integrity (Tendons and Liner)
- Overall Plant Tech. Spec. Upgrade
- Liquid Effluent Releases
- Equipment Qualification
- Moisture Ingress
- Cracked Fuel Blocks

The Overall conduct of operations at Fort St. Vrain, including the licensee's handling of the issues listed above, has been under careful review by the staff since June 23, 1984 when the plant was shut down as a result of failures in the control rod drive mechanisms. In all cases, the issues are under active review by the licensee and the staff, with schedule goals for completion having been established.

All the reviews for individual issues have resulted in a finding that the plant can be restarted and operated safely with certain restrictions. The most significant restriction imposed is a limitation to no greater than 15% power operation pending the licensee's completion of equipment qualification studies related to verifying the qualified life and operability time for safety-related equipment. Examples of other less significant restrictions include a roving fire watch pending completion of modifications to the plant fire protection system and interim operating procedures to protect the control rod drive mechanisms from overtravel damage.

While the staff has concluded that none of the individual problems identified at Fort St. Vrain were significant enough to prevent a restart of the plant, they have raised concerns about the overall conduct of operations at the plant. These concerns were reflected in the staff's October 1984 Assessment Report and the last SALP evaluation wherein the plant was rated Category 3 in 5 out of 12 rating categories, including Plant Operations. To address the concerns, the staff has required the licensee to commission a third party review of their conduct of operations and to commit to correct the deficiencies identified. This third party review has been completed and the licensee has initiated a Nuclear Performance Enhancement Program. The staff has performed a preliminary review of this program and agrees that it should improve the conduct of operations at Fort St. Vrain. Our final review is scheduled to be completed by the end of this month.

In summary, many valid safety issues for Fort St. Vrain have been identified which must, and are, being addressed by the licensee and the NRC. Pending final resolution, and in some cases, modifications to the plant, operation must be restricted. The appropriate restrictions and interim measures have been committed to by the licensee as a condition for restart. These restrictions and licensee commitments have been documented in safety evaluations by the staff and implemented by Region IV through a Confirmatory Action Letter that was issued prior to plant restart. Based on all of the above, all of the identified issues are being adequately addressed by ongoing NRC and licensee activities.

Rancho Seco

As a result of last years SALP report (issued June 20, 1984) and meetings between Region V and the Sacramento Municipal Utility District (SMUD) Board of Directors the Board contracted with LKS Consultants to do an assessment of SMUD management of the Rancho Seco Plant. On November 30, 1984 the LRS Consultants issued a report on their assessment. The report was very frank and was in substantial agreement with NRC's evaluation of SMUD. The report made a number of significant and extensive recommendations to improve SMUD management performance. Over the last year, the licensee has been implementing these recommendations.

The current startup problems are in general due to poor QA/QC performance by the licensee, some of the problem QA/QC performance going back several years. The licensee has shown a change in attitude during the current outage and is agressively pursuing resolutions to these problems. The licensee has voluntarily delayed startup of the plant until these resolutions are acceptable to both the utility and the NRC staff. We have been closely monitoring the licensee's activities. For example, with regard to the Reactor Trip Breakers (RTB) problem the licensee, with the help of GE (Atlanta) and B&W re-certified all of the installed RTBs. Prior to proceeding with plant startup a conference call was held between the licensee, NRR and Region V in which the results of the re-certification was discussed and NRR and Region V indicated that they were in agreement with the licensee that startup can proceed. Augmented receiving inspection will be implemented in the future to assure that problems with as-received RTBs are identified prior to installation.

The licensee initiated an inspection program of Class 1 piping supports during the current shutdown when it concluded that the recent non isolatable high point vent leak was caused by inadequate support of the high point vent piping that resulted from earlier QA/QC breakdowns from 1975 - 1983. The licensee has completed inspection of all supports of modifications made after the 1979 and 1980 inspections that were conducted in response to IEB-79-14 on Seismic Analysis for As-Built Piping Systems. Inspection teams headed by a pipe support stress analyst have recently completed inspection of about 349 supports. An IE - Region team accompanied some of licensee's teams on a number of their walkdowns. In addition, as a result of discussions with IE and Region V regarding the extent of their IEB 79-14 inspections the licensee has expanded its program to include inspecting all of the Class 1 piping system supports that were not inspected in the 1979 and 1980 walk-downs. This will include about 270 piping systems containing about 3000 supports. The effort associated with the pipe support inspections and modifications to correct deficiencies found are expected to delay plant startup until about August 15, 1985. The licensee will not restart the plant until they and the NRC are satisfied that any pipe support problems have been resolved.

Region V and the Resident Inspectors have been closely monitoring the expanded inspection program. In addition, members of the NRR, IE and Region V staff attended the licensee's Management Safety Review Committee (MSRC) meeting at which the startup problems, including the pipe support problem, and approaches to resolving the problems were discussed and decided upon. Also discussed during the meeting was additional training for QA personnel to improve quality at Rancho Seco. As a result of an NRR, IE and Region V management team meeting with the licensee management and the SMUD Board of Directors, the licensee has committed to provide a Refueling Outage Restart Report that will detail the problems encountered during the outage and the proposed short-term and long-term corrective actions.

SAN ONOFRE UNIT 1 (SONGS 1)

SONGS-1 returned to service in November 1984 after being shut down for nearly three years due to seismic design concerns. During much of this shutdown, the utility was not certain if plant restart would be economically possible; hence, many modifications and analyses were deferred.

The licensee utilizes an Integrated Living Schedule methodology to schedule plant modifications in a manner which maximizes improvements in safety in a cost effective manner. At present, the licensee has committed to complete analyses and install equipment to resolve the following long-standing regulatory issues prior to restart from the Cycle IX refueling outage scheduled to begin on November 30, 1985:

(1) Long-term seismic upgrading - analysis and hardware implementation,

(2) Fire Protection - design and installation of a dedicated safe shutdown system and other Appendix R modifications,
and

(3) Equipment Qualification - qualification or replacement of 52 pieces of equipment.

The installation of a third auxiliary feedwater pump will take place during the Cycle IX outage as part of the fire protection modifications. Additional modifications to provide all equipment needed for a third auxiliary feedwater train will be completed during the Cycle X refueling outage.

Other regulatory issues which are not yet technically resolved include:

(1) Transamerica-Delaval (TDI) diesel generators - determination of actions required to ensure long-term operability,

(2) Control Room Habitability - further documentation of analyses and compensatory measures to determine if a redundant control room HVAC system is needed, and

(3) Supplement 1 to NUREG-0737 (Generic Letter 82-33) -DCRDR, SPDS, Reg. Guide 1.97.

On TDI Diesels, the staff's Safety Evaluation dated November 19, 1984 has approved the necessary operability and reliability of the engines until the November 30, 1985 refueling outage, during which additional engine inspection will be performed. The staff will address the long-term operability of these engines prior to restart from the refueling outage.

On Control Room Habitability, the staff has requested further information which the licensee has agreed to provide by September 1, 1985. Until technical resolution of this issue is reached, implementation schedules for any upgrades cannot be determined.

Resolution of Generic Letter 82-33 on Emergency Response Capability items requires a licensee submittal. The DCRDR Program Plan and Reg. Guide 1.97 response are scheduled to be submitted in December 1985. The SPDS criteria are to be submitted in October 1986, after the DCRDR review has begun.

PALISADES

The following long-term regulatory activities remain open at the Palisades Plant.

Main Steam Line Break with Single Failure of Main Steam Isolation Valve

In 1982, during the SEP review of Palisades, the staff concluded that to ensure decay heat removal capability following a large steam line break upstream of the main steam isolation valve for that steam line, the effects of the single failure of the main steam isolation valve in the other main steam line must be precluded. These adverse effects, the blowdown of both steam generators, could result from the type of isolation valve employed. The valve is installed as a reverse-flow check valve that is held open by its operator unless an isolation signal is received at which point the operator releases the check valve and the steam flow passing through in the reverse direction closes the valve. However, for a steam line break upstream of such an isolation valve, steam flow in the forward direction through the valve would hold the valve open and reliance on the other main steam isolation valve in the intact steam line is necessary to prevent blowdown of both steam generators. The concern about this condition was heightened by three failures of a main steam isolation valve to close following shutdown and cooldown since the plant was licensed in 1970, the last failure being in 1973. Corrective actions were taken following each failure. In response to this concern, the licensee proposed to make modifications to preclude such single failure potential by the end of the 1984 refueling outage.

In August 1983, the licensee requested that the modifications be deferred until the 1986 refueling outage so that alternative corrective actions might be evaluated further. The extension was approved and the licensee recently submitted a probabilistic risk analysis that concludes that modifications to preclude this single-failure are not necessary. Additionally, based on this analysis, the licensee has withdrawn its commitment to make modifications to preclude single failure of main feedwater isolation valves allowing continued feedwater addition to a steam generator that has suffered a main steam line break inside containment. This commitment had been made in response to IE Bulletin 80-04, Main Steam Line Break with Continued Feedwater Addition. Due to resource limitations, the staff had not planned to start its review of the licensee's submittal until November 1985. The staff is reexamining priorities to expedite this review.

The licensee has taken measures to mitigate the effects of the failure of a main steam isolation valve during this postulated event. One of the major concerns was dry-out of the steam generators because one of the two auxiliary feedwater pumps is steam turbine driven and, with the loss of steam pressure from blowing down both steam generators, the steam driven pump would be inoperable, leaving only one pump. At the last refueling outage, another auxiliary feedwater pump was added which is motor driven and doubles the capacity available on loss of the steam driven pump, thereby reducing the potential for steam generator dry-out. In addition, procedures are being upgraded for using the condensate pumps and system as a backup to the auxiliary feedwater if offsite power is available. Wide range steam generator level indication channels have been added so that the water level can be monitored if a dry-out condition is approached. New auxiliary feedwater lines have been installed along with an improved sparger that minimizes the probability of water hammer and removes previous limitations on auxiliary feedwater flow. A redundant condensate storage tank level channel was added to ensure the operator's ability to determine adequate source of make-up water. Inservice inspection of the main steam piping conducted during the refueling outages in 1979 and 1983 showed no evidence of significant deterioration in the critical welds sampled since the plant began commercial operation in 1971. These inspections have confirmed the low probability of the pipe break. The causes of MSIV failures experienced in the past have been identified and corrected, and MSIV operability is verified during each refueling outage. Based on these considerations, the staff concludes that the plant can be operated safely in the interim while the licensee's analysis is being reviewed. By letter dated June 21, 1985, the licensee stated that if the staff does not agree with its conclusion and replacement of the main steam isolation valves was deemed necessary, it would have to be scheduled for the next refueling outage which would occur approximately two years after completion of the MPC review.

The following longstanding multiplant action items were identified by Project Managers as having taken a longer time to resolve than desired.

A. Containment purge and vent was identified by eight project managers.

There are several different issues involved with this multiplant item. Some of the plants do not want to limit the amount of time the purge valves are open, others do not want to have the valves automatically isolate on a high radiation signal, and one utility has not shown that the valves remain operable following a design basis LOCA. The BWR Owners Group has stated that the staff's position on isolation of lines less than 3 inches in diameter is a backfit. The staff has denied that this is a backfit and a meeting was held in an effort to resolve the issue. The staff is reevaluating its position as a result of this meeting.

B. Fire protection was identified by eleven project managers. In most cases, the review of originally submitted programs and exemption requests is complete. However, additional exemption requests continued during the last two years and completion of the staff review of these requests is scheduled through the end of 1986. Recently, a trial program was initiated to have the fire protection reviews for two plants performed by a contractor. If successful, the completion of the reviews will be earlier than currently scheduled.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SEP 05 1985

MEMORANDUM FOR: Chairman Palladino
Commissioner Roberts
Commissioner Asselstine
Commissioner Bernthal
Commissioner Zech

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: FURTHER NRC ACTIONS ON DAVIS-BESSE

In his August 16, 1985 memorandum (COMJA-85-11) for the other Commissioners, Commissioner Asselstine posed a number of issues which he believes the Commission should address regarding the recent Davis-Besse incident. Written comments were provided on Commissioner Asselstine's memorandum by Chairman Palladino on August 28, 1985 and by Commissioner Zech on August 30, 1985. With respect to the first two items concerning restart of the plant and long-term improvements in the licensee's performance, the staff intends to keep the Commission informed of its efforts in these areas and will brief the Commission prior to permitting restart of the plant. The staff's response to items 3, 4 and 5, pertaining to possible failings of the staff's, as well as the licensee's, performance is contained in Enclosure 1 to this memorandum.

Commissioner Asselstine suggested that the Commission establish an "independent" review team composed of members of the Licensing Board Panel to review and report to the Commission in 60 to 90 days on these latter issues concerning the adequacy of the licensee's and staff's evaluations of the auxiliary feedwater system, possible problems in the inspection and enforcement program, and the adequacy of Babcock & Wilcox plant design. It is not at all clear that such a review is needed to emphasize that the Commission and the staff need to be aware of the implications of events like the Davis-Besse transient for the NRC's regulatory performance and thereby improve that performance. For example, by the enclosed August 5, 1985 memorandum, I directed the staff office directors to appraise the effectiveness of their programs and the lessons of the Davis-Besse event for the purpose of making NRC a better regulatory agency. I intend to meet periodically with the office directors to monitor progress of these efforts. My first meeting is September 5th.

As indicated in my memorandum to the Chairman of August 5, Harold Denton has directed that he be provided monthly status reports on certain plants and on certain generic issues. Plant maintenance, an apparently important factor in the Davis-Besse event, has been the subject of increased Commission and staff attention and is the subject of a NUMARC initiative. The Commission and the ACRS have closely reviewed the backfitting issue.

The independent review suggested by Commissioner Asselstine is far-reaching and cuts across the scope of the Commission's regulatory program. It is doubtful that such a review, even if conducted by persons nominally familiar with the agency's internal workings, could be completed in 60 to 90 days. Substantial staff resources will be required to participate or assist in a formal review of the regulatory progress. In any event, if the Commission wishes to establish such a review panel, the Commission should focus the review on very precise questions that it wants addressed. Commissioner Asselstine's memorandum suggests a few issues, but I believe, as indicated in the enclosure to this memorandum, that those issues are being addressed.

In sum, I am not suggesting that our regulatory program cannot be improved. As I indicated above, steps are being taken to identify and implement improvements. However, I doubt the need for an "independent" review to confirm the wisdom of re-assessing the agency's effectiveness in dealing with or preventing incidents like the one that occurred at Davis-Besse. As part of its day-to-day responsibility to ensure adequate protection of public health and safety, the staff is dedicated to taking a hard look at the agency's regulatory performance and improving it.

William J. Dircks
Executive Director for Operations

Enclosures:
1. Response to Issues 3, 4 & 5
2. August 5, 1985 memorandum

cc:
SECY
OGC
OPE

Enclosure 1

ISSUE 3: REVIEW OF THE DAVIS-BESSE AUXILIARY FEEDWATER SYSTEM

The staff's investigation of the June 9, 1985 event at Davis-Besse is not complete but has already identified an apparent potential single failure in the Auxiliary Feedwater (AFW) System which was not identified by the licensee or the staff in the original licensing review. It appears that the AFW containment isolation valves were originally described by the licensee, and accepted by the staff, as equipment that was "fail-safe" in that its failure mode would leave the valve opened, thereby allowing water to flow to the steam generators. The recent staff review indicates that under some transient circumstances the valves could be called upon to close and a subsequent failure of one would leave it closed. The original design review and staff audit of the design simply did not uncover the transient condition of concern.

It is worth noting that the potential single failure of interest did not actually occur during the June 9, 1985 event but was uncovered as a result of the detailed staff review of the event.

The Davis-Besse Steam and Feedwater Rupture Control System (SFRCS) is a complex system which is used to initiate the AFW system. The staff is re-examining the design of this system and its net contribution to safety but has not yet identified any deficiencies in the original licensing review.

The licensee's and staff's review of the reliability of the AFW was initiated following the TMI-2 accident and was reinforced after publication of NUREG-0667 "Transient Response of B&W-Designed Reactors," May 1980.

In retrospect, it is clear that the completion of the reliability analyses and their reviews simply took too long. However, at no time did any of the analyses indicate that the reliability of the AFW was so low that immediate corrective action was needed and the staff therefore afforded the licensee every opportunity to develop analyses and plans for alternative actions to improve the system's reliability. In fact, even at this juncture, a strict application of the backfit (PRA/cost benefit) approach to this one issue in isolation (i.e., without consideration of the maintenance problems at Davis-Besse) might not support requiring installation of the additional AFW pump.

A major consideration not explicitly factored into the original design, staff licensing review, or reliability analyses is the poor maintenance practices which contributed to the common-mode failure of the AFW system. Rather, an underlying assumption to the NRR review process is that licensees maintain their facility in a safe condition, that is, consistent with the licensing basis. It is difficult to develop a useful probability estimate for factoring in poor maintenance on a generic basis and virtually impossible on a plant-specific basis. This is an inherent limitation of reliability analysis and does not represent a failure on the part of either the licensee or the staff in analyzing design. This aspect of the event (whether or not a third AFW pump should be required and the importance of maintenance in this decision) highlights a difficulty in using PRA and cost-benefit analyses and has generic implications for NRC backfitting practices.

In general, the staff now uses probabilistic assessments coupled with cost-benefit analyses as an important, but not the sole, factor in safety decisions. Deterministic or engineering analyses are also necessary. There are always difficulties in applying generic analyses to specific situations, where the details of the particular design and operation can change the effectiveness and cost of the item being studied. In addition, staff and licensee analyses need to recognize the interrelationship among design, maintenance of the design, and operations. Failures in maintenance and operations can undermine the assumptions in the licensing and PRA analyses. Licensing decisions and performance appraisals need to be made with a full understanding of the design, maintenance and operations and their interrelationships. Where weaknesses in plant operation and maintenance are recognized, they need to be addressed directly so that safety is improved while the analysis assumptions are preserved.

ISSUE 4: NRC'S INSPECTION AND ENFORCEMENT PROGRAM FOR DAVIS-BESSE

The NRC's inspection and SALP programs clearly identified weak performance by Toledo Edison in several functional areas at Davis-Besse. In retrospect, correction of these performance weaknesses was not timely; however, steps are in progress to improve the licensee's performance and have shown some positive results. The staff did not anticipate that these performance problems would result in multiple equipment failures as occurred during the June 9, 1985, event.

The staff was aware of significant licensee problems and used management initiatives and enforcement options to address them as described below:

- A management meeting in November 1983 which resulted in the company initiating a performance enhancement program (PEP).
- Approximately monthly meetings with the licensee at the Branch Chief and Section Chief level to provide input to the PEP and periodic senior management meetings to monitor and assess PEP progress.
- Assignment of a second Resident Inspector in January 1984.
- Conduct of a special quality assurance program inspection and a Performance Appraisal Team inspection in 1984.
- A management meeting among the President of Toledo Edison, the Director, OIE, and the Regional Administrator in November 1984 to discuss the need for improved licensee communication and support for program improvements.

- The assessment of a $90,000 civil penalty in November 1984 for violations related to a breakdown in the licensee's management control system.

- A public SALP meeting in December 1984 to discuss the appraisal which resulted in five category 3 ratings and the Regional Administrator publicly stating that "a continuance or further decline of this performance level is unacceptable to me".

- A meeting between the Chief Executive Officer (CEO) and the Regional Administrator in December 1984 to discuss problems and to urge the CEO to bring in outside management assistance to deal with Davis Besse problems.

- The issuance of two Confirmatory Action Letters (CALs) in 1985 addressing the failure of Control Rod Drive Mechanism leaf springs, and damage sustained to several auxiliary steam supply feed pump turbine piping restraints.

- A Commission briefing in February 1985 where performance problems at Davis-Besse were discussed.

- A follow-up meeting by the Regional Administrator with the CEO in May 1985 to review actions being taken to improve regulatory performance.

- The assessment of a $100,000 civil penalty in July 1985 for failure to properly control plant activities, effectively communicate, identify root causes of problems and take adequate corrective actions.

Recognizing that we cannot run the plants for the licensees, in retrospect the actions taken above were not sufficiently effective. The timeliness to effect corrective action was too slow. Stronger enforcement action, for example, orders to modify license or to derate power level until corrective actions were completed, could have been pursued to obtain more timely corrective action.

As a result of lessons learned from this event, the following steps are being taken to improve the staff's early identification and timely resolution of problems such as occurred at Davis-Besse:

- A new inspection approach is being developed and field tested that may prove effective in identifying the type of problems that led to the Davis-Besse event. A special team inspection has been developed for trial use at Turkey Point. The inspection approach will concentrate on the operational readiness of one safety system with attention to the details of modifications and design control, quality of maintenance, surveillance, and testing applicable to the system. This type of inspection will require more operations engineering diagnostic capability than our normal inspection program which mainly verifies licensee engineering decisions.

- Each morning, there is a conference call between representatives of IE and NRR to review and assess operational events reported to the Operations Center and contained in the regional daily reports. We are increasing our emphasis on and improving our procedures for systematically assessing the frequency and severity of events on a plant-by-plant basis. The objective is to promptly identify specific plants warranting additional attention in the inspection program.

- To better coordinate efforts with the regional offices in addressing problems at operating reactors, including those identified above, IE has established a regional project coordination function. Project coordinators in IE have been assigned for each Regional Office. The project coordinators provide a day-to-day working level point of contact with the regions to evaluate and follow-up on emerging problems. In addition, the project coordinators are responsible for independent analysis of data and indicators in order to detect the emergence of potential problems.

- Additional emphasis is being placed on our assessments of the regions on their ability to identify poor licensee performance and their subsequent efforts to improve this performance.

- Increased guidance is being developed on 1) regulatory action to be taken following the assignment of a category 3 SALP rating in one or more functional areas and 2) "Regulatory Improvement Programs" and their use as regulatory commitments.

ISSUE 5: IMPLICATIONS OF OPERATING EXPERIENCE ON THE ADEQUACY OF THE B&W PLANT DESIGNS

B&W plant operating experience has been studied extensively, especially since the TMI-2 accident, and although we have not completed our evaluation of the Davis-Besse event, our preliminary conclusion is that our previous views on the adequacy of the B&W plant design remain unchanged. The areas of concern identified and addressed on the B&W designs have been documented in IE Bulletin 79-27, NUREG-0667 and the TMI Action Plan and include rapid pressure and temperature response related the Once-Through Steam Generator (OTSG) design; PORV challenge rate; instrumentation and annuciator system (i.e., "non-nuclear instrumentation"); the integrated control system (ICS); use of 2 AFW pumps rather than 3 for most B&W plants; and the complexity of AFW initiation.

Most of these areas have received extensive staff review and some significant improvement has been made. These include: the high PORV challenge rate for B&W plant has been virtually eliminated by post TMI-2 changes; all B&W plants have increased the available instrumentation for recovering from AC power losses; all NUREG-0667 recommendations have been addressed in whole or in part (see the attached status) and AFW reliability improvements have been made on all B&W plants in response to the TMI Action Plan.

The staff recognizes that B&W plants may need improvements and, therefore, as part of the NRR reorganization staff resources are being increased for B&W plants and the staff will continue to work independently and in cooperation with B&W and the B&W owners group to identify necessary and cost-beneficial safety improvements.

STATUS OF NUREG-0667 RECOMMENDATIONS AT B&W FACILITIES

ITEM NO.	RECOMMENDATION	STATUS
1.A	AFW SEISMIC QUAL.	ALL REVIEWS COMPLETE EXCEPT OCONEE (TO COMPLETE IN FALL 1985).
1.B	AFW DIVERSE POWER SUPPLIES	COMPLETE
1.D	SAFETY GRADE AFW	ALL COMPLETE EXCEPT TMI-1 (TO COMPLETE RESTART HEARING LONG-RANGE ITEMS BY NEXT REFUELING), RANCHO SECO (REPLACE TWO VALVES), AND CRYSTAL RIVER 3 (UPGRADE CONTROL SYSTEM). POWER SUPPLY TO TWO VALVES AT OCONEE ARE NOT SAFETY GRADE
2.B	AFW AUTO START	ALL COMPLETE EXCEPT TMI-1 (COMPLETE SYSTEM TEST AFTER RESTART, AND COMPLETE AUTOMATIC CONTROL AT NEXT REFUELING) AND CRYSTAL RIVER (ISSUE TECHNICAL SPECIFICATION)
3	DAVIS BESSE 1 DIVERSE DRIVE AFW	LICENSE CONDITION OF JANUARY 8, 1985 REQUIRES INSTALLATION AT 1985 REFUELING

ITEM NO.	RECOMMENDATION	STATUS
5.A	IMPROVE ICS/NNI POWER BUS SEPARATION AND SIGNAL PATH CHANNELIZATION	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
5.C	IMPROVE ICS/NNI MULTIPLE INSTRUMENT FAILURE INDICATION	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
5.E	ICS/NNI POWER BUS REDUNDANCY	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
5.H	ICS/NNI FOLLOW-UP OF RESPONSES TO IEB 79-27	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
6	INSTALLATION OF SAFETY VITAL INSTRUMENT PANEL	INSTALLATIONS AT ALL B&W FACILITIES IS COMPLETE. STAFF REVIEW COMPLETE RANCHO SECO. REVIEW IN PROGRESS AT ANO-1, DAVIS BESSE, CRYSTAL RIVER, OCONEE, TMI-1
7	IMPROVE USE AND DISPLAY OF IN-CORE THERMOCOUPLES	COMPLETE

ITEM NO.	RECOMMENDATION	STATUS
8	SAFETY GRADE VENT AND PURGE ISOLATION ON HIGH RADIATION	ALL COMPLETE EXCEPT RANCHO SECO (ISSUE TECHNICAL SPECIFICATIONS)
13	OPERATOR TRAINING ON CRYSTAL RIVER 3 EVENT	COMPLETE
14	EMERGENCY PROCEDURES FOR LOSS OF NNI/ICS	IMPROVEMENTS IMPLEMENTED AT ALL B&W FACILITIES. RESPONSES TO STAFF QUESTIONS BEING EVALUATED BY STAFF (B&W OWNERS GROUP SUBMITTAL OF JANUARY 11, 1985)
15	MANDATORY SIMULATOR TRAINING FOR OPERATORS	COMPLETE
16	RCP RESTART CRITERIA	COMPLETE
17	ALTERNATE SOLUTION TO PORV UNRELIABILITY/SAFETY SYSTEM CHALLENGE	COMPLETE. FOR PARTS (A)-(F) OF ITEM 17, THE FOLLOWING ACTIONS WERE TAKEN FOR B&W FACILITIES: (A) SAFETY GRADE PORV NOT REQUIRED. (B) REDUNDANT PORV POSITION INDIC. INSTRUMENTATION INSTALLED. (C) DUAL SAFETY-GRADE PORV BLOCK VALVES NOT REQUIRED. (D) EPRI TEST PROGRAM COMPLETED. (E) ANTICIPATORY REACTOR TRIP ON TOTAL LOSS OF FEEDWATER INSTALLED. (F) PORV AND REACTOR TRIP SETPOINTS RESET. PORV LIFT PRESSURE SETPOINT IS ABOVE REACTOR TRIP SETPOINT.

ITEM NO.	RECOMMENDATION	STATUS
18	IREP CRYSTAL RIVER 3 STUDY	COMPLETE
20	RCP TRIP DURING SMALL BREAK LOCA	PROCEDURES IN PLACE. B&W OWNERS GROUP SUBMITTAL UNDER STAFF REVIEW.

BEST COPY AVAILABLE

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

December 16, 1985

The Honorable Edward Markey, Chairman
Subcommittee on Energy Conservation and Power
Committee on Energy and Commerce
United States House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Enclosed for your information is an announcement that the Nuclear Regulatory Commission staff has proposed a $900,000 fine against the Toledo Edison Company for 10 alleged violations of NRC requirements relating to the June 9, 1985, loss of main and auxiliary feedwater incident at the Davis-Besse Nuclear Plant.

Also enclosed for your information is a letter to the Toledo Edison Company and Notice of Violation and Proposed Imposition of Civil Penalties.

This announcement will be mailed to the news media today.

Sincerely,

Carlton Kammerer, Director
Office of Congressional Affairs

Enclosure:
As stated

cc: Rep. Carlos Moorhead

UNITED STATES
NUCLEAR REGULATORY COMMISSION
Office of Public Affairs
Washington, D.C. 20555

No. 85-168
Tel. 301/492-7715

FOR IMMEDIATE RELEASE
(Monday, December 16, 1985)

NRC STAFF PROPOSES $900,000 FINE AGAINST TOLEDO EDISON COMPANY FOR ALLEGED VIOLATIONS ASSOCIATED WITH JUNE 9, 1985, INCIDENT AT DAVIS-BESSE

The Nuclear Regulatory Commission staff has proposed a $900,000 fine against the Toledo Edison Company for 10 alleged violations of NRC requirements relating to the June 9, 1985, loss of main and auxiliary feedwater incident at the Davis-Besse Nuclear Plant near Toledo, Ohio.

The fine is based on the results of an investigation of the incident by an NRC team from the NRC's headquarters in Bethesda, Maryland, and on the results of inspections by resident inspectors at the site and regional inspectors based in the NRC's Regional Office in Glen Ellyn, Illinois.

In a letter to Toledo Edison Company on the proposed fine, James Taylor, Director, Office of Inspection and Enforcement, said the June 9 incident is "significant because a safety system designed to prevent or mitigate a serious safety event did not perform its intended safety function when actually called upon to work. By the time the event ended," he said, "there had been 12 malfunctions of major safety-related components and subsystems."

The reactor was at 90 per cent power when it shut down automatically at 1:35 a.m. June 9 due to the loss of main feedwater to the plant's steam generators.

Davis-Besse contains a pressurized water reactor in which high temperature water in the reactor is kept under pressure to prevent boiling (the primary system). This water then flows through a vessel called a steam generator, or heat exchanger. As the primary water flows through small tubes in the steam generator, it gives off heat, boiling surrounding water into steam, which then flows to a turbine to generate electricity. Without feedwater surrounding the tubes in the steam generator to draw off heat from the primary system, the reactor core could begin to overheat, eventually leading to a serious fuel damage accident.

Following the loss of main feedwater to the steam generators on June 9, a control room operator pushed two incorrect buttons in activating an emergency system called a Steam Feedwater Rupture Control System (SFRCS). This system realigns valves so that water can be pumped into the steam generators from auxiliary feedwater pumps.

When the operator pushed the wrong buttons, two valves on this system closed. The operator realized and corrected his error almost immediately. However, the two valves did not reopen. Seconds later, the two auxiliary feedwater pumps came on, but almost immediately shut off on overspeed.

About 12 minutes into the event, operators activated a small, motor-driven pump, which was used to supply water to a steam generator. At about the same time, operators manually opened the two closed valves and restarted the auxiliary feedwater pumps, ending the incident.

Eight of the 10 alleged violations proposed by the NRC staff each carry a $100,000 civil penalty. They are: (1) failure to identify that the torque switch bypass settings for certain safety-related motor-operated valves were improper. Proper testing would have shown that the design settings on the switches involved with the closed valves were improper, causing the valves to remain shut when called upon to open; (2) failure to determine that the auxiliary feedwater pump turbines would not operate properly with steam supplied through the crossover steam piping; (3) failure of its preoperational testing program to identify that the two auxiliary feedwater isolation valves would not function under certain conditions; (4) failure to assure that maintenance procedures for the performance of some safety-related activities were adequate; (5) failure to test certain valves quarterly as required; (6) failure to take prompt and adequate corrective action when a problem was identified previously with one of the two closed valves; (7) failure to satisfy the NRC requirements that no single failure would prevent safety systems from functioning (the two valves remained closed even after the operator pushed the correct buttons); and (8) failure to adequately train auxiliary operators on resetting the overspeed trip mechanism on the auxiliary feedwater pump turbines.

In addition to the above, a fine of $50,000 each is'proposed for two alleged violations: failure by the licensee to identify maintenance and troubleshooting deficiencies at the plant, and failure to verify that the installations of pipe hangers were carried out in conformance with design drawings.

The NRC's headquarter's team concluded that the "underlying cause of the. . .event. . .was the licensee's lack of attention to detail in the care of plant equipment." It added: "The licensee has a history of performing troubleshooting, maintenance and testing of equipment, and of evaluating operating experience related to equipment in a superficial manner, and, as a result, the root causes of the problems are not always found." The reactor remains shut down.

Following the incident, Toledo Edison undertook a program to strengthen management. In addition, it has conducted extensive root cause evaluations of malfunctioning equipment, conducted extensive reviews of system and equipment operability, and performed additional testing, where needed.

While acknowledging the corrective action already taken, the NRC staff proposed the fine to emphasize the importance the NRC attaches to such significant violations and to ensure that the licensee maintains an effective and aggressive management system.

The licensee has until January 12, 1986 to either pay the fine or protest it. If the fine is protested and subsequently imposed formally by the NRC staff, the utility may request a hearing.

#

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Docket No. 50-346
License No. NPF-3
EA 85-107

DEC 13 1985

Toledo Edison Company
ATTN: Mr. John P. Williamson
Chairman and Chief
Executive Officer
Edison Plaza
300 Madison Avenue
Toledo, OH 43652

Gentlemen:

This refers to the report of the NRC Team sent to Davis-Besse by the NRC Executive Director for Operations as a result of the loss of main and auxiliary feedwater event on June 9, 1985 and the inspections conducted by the Region III staff during the period March 26 - September 9, 1985 of activities authorized by NRC Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station. As a result of these efforts, violations of NRC requirements were identified. The results of the inquiry by the NRC Team were published in July 1985 in NUREG-1154, "Loss of Main and Auxiliary Feedwater Event at the Davis-Besse Plant on June 9, 1985." This June 9, 1985 loss of feedwater event at the Davis-Besse facility is significant because a safety system designed to prevent or mitigate a serious safety event did not perform its intended safety function when actually called upon to work. By the time the event ended (approximately 30 minutes after it began), there had been 12 malfunctions of major components or subsystems.

Item I described in the enclosed Notice of Violation and Proposed Imposition of Civil Penalties involves two violations which resulted in the failure of a major safety system to perform its intended safety function when it was actually called upon to work on June 9, 1985. The violations described in Item I resulted from the failure of your staff to identify that torque switch bypass settings for certain safety-related motor-operated valves were improper and that the auxiliary feedwater pump turbines would not operate properly with steam supplied through the crossover steam piping. Both of these conditions prevented the auxiliary feedwater system from performing its intended safety function when actually called upon to work.

Item II described in the Notice includes six separate violations involving failures in your maintenance, testing, training, analysis, and corrective action programs which led to the June 9, 1985 event. Some of these failures resulted from inadequate preoperational and surveillance test procedures, inadequate maintenance procedures, and your failure to follow those procedures that were adequate.

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Item III described in the Notice involve generic problems related to maintenance and troubleshooting identified separately from the June 9 event. Item III includes a violation of a Technical Specification Limiting Condition for Operation caused by improper wiring of an auxiliary feedwater flow rate instrument. This condition existed from April 13 to June 2, 1985. The other violation involves an example of a failure to follow procedures and an inadequate procedure for performing safety-related activities.

Item IV described in the Notice involves violations related to your failure to verify that hanger installations were carried out in conformance with design drawings. When substantial defects were identified by your Davis-Besse site staff during March and April 1985 in the Auxiliary Feedwater Pump Turbine Steam Supply hangers, your staff used sketches instead of nonconformance reports as required to report these deficiencies and failed to adequately assess individual and collective hanger failures to ensure adequate evaluation of the root cause of the problem. In addition, your failure to report to the NRC within 30 days the total extent of degradation of the piping system after you became aware of these failures is also described.

The NRC Team concluded that "the underlying cause of the loss of main and auxiliary feedwater event of June 9, 1985 was the licensee's lack of attention to detail in the care of plant equipment. The licensee has a history of performing troubleshooting, maintenance and testing of equipment, and of evaluating operating experience related to equipment in a superficial manner and, as a result, the root causes of the problems are not always found and corrected." The NRC Team further stated that, "Engineering design and analysis effort to address equipment problems has frequently either not been utilized or has not been effective."

Over the past two years, the NRC has directed considerable time and resources toward improving the regulatory performance at the Davis-Besse facility. This increased attention by the NRC staff was initiated as a direct result of prior poor performance by Toledo Edison Company concerning activities at Davis-Besse. Your poor performance resulted in the issuance of a Category 3 rating for Maintenance activities in the Systematic Assessment of License Performance (SALP) period. Frequent management meetings were also held to discuss and emphasize the need for improved regulatory performance. This included three separate meetings between senior NRC management and the Chief Executive Officer of Toledo Edison Company during the seven month period preceding the event. In addition, the NRC took escalated enforcement action in November 1984 for violations related to a breakdown in Toledo Edison Company's management control system. That enforcement action resulted in the proposal of a $90,000 civil penalty. Another $100,000 civil penalty was proposed in July 1985 for violations involving the licensee's failure to properly control plant activities, effectively communicate, identify root causes of problems, and take adequate corrective actions - based on issues which took place prior to the June 9, 1985 event.

Although the Toledo Edison Company has initiated corrective actions for the specific findings referenced above, and has continued working on a Performance Enhancement Program, the equipment failures that occurred during the June 9, 1985 event and the violations identified in the attached Notice indicate that its corrective actions were ineffective in precluding this event. These problems apparently stemmed from a long history of ineffective and inadequate management attention and direction over the operation and maintenance of the Davis-Besse facility.

The NRC staff acknowledges that since the June 9, 1985 event, the licensee has taken significant initiatives to correct the problems identified in the Notice of Violation. However, to emphasize the seriousness with which the NRC views the occurrence of these violations and to ensure that the Toledo Edison Company maintains an effective and aggressive management system to prevent such violations and their adverse consequences to public health and safety, the NRC is proposing extraordinary enforcement actions. Accordingly, I have decided, after consultation with the Commission, to issue the enclosed Notice of Violation and Proposed Imposition of Civil Penalties in the amount of Nine Hundred Thousand Dollars ($900,000) for the violations set forth in the enclosed Notice. These violations have been categorized in accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1985).

The two violations described in Item I and the six violations in Item II have been categorized collectively as a Severity Level I problem because they resulted in the failure of the auxiliary feedwater system to perform its intended safety function when actually called upon to work on June 9, 1985. The base civil penalty for a Severity Level I violation is $100,000. However, as the NRC intends to apply its full enforcement authority as a result of this serious breakdown in management controls, the statutory limit of $100,000 per violation is being proposed for these eight violations.

The two violations in Item III have been categorized as a Severity Level III problem. The base civil penalty for a Severity Level III violation or problem of $50,000 is being proposed. The violations in Item IV have been categorized as a Severity Level III problem and the base civil penalty of $50,000 is also being proposed.

You are required to respond to the enclosed Notice, and you should follow the instructions specified therein when preparing your response. Your response should specifically address the corrective actions you will take or have taken to increase management attention and direction over the operation and maintenance of the Davis-Besse facility. You may reference previous correspondence in your response. Your reply to this letter and the results of future inspections will be considered in determining whether further enforcement action is warranted.

In accordance with 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

The responses directed by this letter and the enclosed Notice are not subject to the clearance procedure of the Office of Management and Budget, as required by the Paperwork Reduction Act of 1980, PL 96-511.

Sincerely,

James M. Taylor, Director
Office of Inspection and Enforcement

Enclosure:
Notice of Violation and
Proposed Imposition of
Civil Penalties

cc w/enclosure:
L. Storz, Plant Manager

NOTICE OF VIOLATION AND PROPOSED IMPOSITION OF CIVIL PENALTIES

Toledo Edison Company
Davis-Besse Nuclear Power Station

Docket No. 50-346
License No. NPF-3
EA 85-107

As a result of the inquiry conducted by the NRC Team in response to the loss of main and auxiliary feedwater event that occurred on June 9, 1985, and as a result of the inspections conducted during the period March 26 - September 9, 1985 by the Region III staff, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1985), the NRC proposes to impose civil penalties pursuant to Section 234 of the Atomic Energy Act of 1954, as amended, ("Act"), 42 U.S.C. 2282, PL 96-295, and 10 CFR 2.205. The particular violations and associated civil penalties are set forth below:

I. 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires that design control measures provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculation methods, or by the performance of a suitable testing program.

A. Contrary to the above, design control measures to verify or check design specifications established in 1983 for the setting of Limitorque motor-operated valve torque switch bypass settings were not adequate to assure the proper operation of valves AF599, AF608 and MS106 when called upon to perform their safety function. The design control measures failed to identify that the specifications for the torque switch bypass switch settings were improper. Since these measures were inadequate, and since the licensee did not perform suitable testing to assure the valves would perform properly under all service conditions, these valves failed to operate properly on June 9, 1985 when called upon to perform their' intended safety function.

B. Contrary to the above, as of June 9, 1985 design control measures had failed to reveal design deficiencies (build-up of condensation) associated with the crossover steam piping and with steam supplied from the main steam system, and thus the auxiliary feedwater pump turbines would not function as required to mitigate the design basis accident described in the Updated Safety Analysis Report in Section 15.4.4, "Steam Line Break." In addition, as of June 9, 1985 the licensee had not performed testing to assure the auxiliary feedwater pump turbines would perform under all predicted service conditions. As a result, on June 9, 1985, both auxiliary feedwater pump turbines tripped on overspeed, thus rendering the auxiliary feedwater system inoperable when called upon to perform its intended safety function.

II. A. 10 CFR Part 50, Appendix B, Criterion XI, "Test Control" requires that the test program include, as appropriate, proof tests prior to installation, preoperational tests, and operational tests during nuclear power plant operation of structures, systems and components. In addition, 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" requires that the testing procedures be appropriate to the circumstances.

Contrary to the above, as of June 9, 1985, Test Procedure 273.01, "Auxiliary Feedwater System Preoperational Test," Revision 1, dated November 18, 1976 and Surveillance Test 5071.02 "Auxiliary Feedwater System Refueling Test," Revision 11, dated May 16, 1985, were not appropriate to the circumstances in that they failed to assure that valves AF 599 and AF 608 would satisfactorily perform under potential service conditions. As a result, preoperational testing performed in accordance with Test Procedure 273.01 did not identify the inability of valves AF 599 and AF 608 to function at the design differential pressure. Surveillance testing performed in accordance with Surveillance Test 5071.02 did not identify the improperly set torque switch bypasses for valves AF 599, AF 608, and MS 106. Surveillance testing also did not identify the unbalanced torque switch for valve MS 106.

B. 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires that activities affecting quality be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and that the activities be accomplished in accordance with these instructions, procedures, or drawings.

1. Contrary to the above, Steps 7.3.1 and 7.3.2 of Maintenance Procedure 1410.32, "Removal and Repair of Limitorque Valve Controls," Revision 2, dated June 4, 1982, were not appropriate to the circumstances in that the instructions for setting the torque switch bypass switch were inadequate. As a result, as of June 9, 1985, the torque switch bypass switches for valves AF 599, AF 608 and MS 106 were not set to the design values.

2. Contrary to the above, during a wiring check for the control power fuses for valve MS-106 by the licensee after the June 9, 1985 event, a 15 amp fuse was found installed rather than a 10 amp fuse as required by Drawing E46B, Sheets 54A and 54B, Revision 3.

3. Contrary to the above, activities affecting quality had not been accomplished in accordance with Administrative Procedure 1844.00, "Maintenance," Revision 13, dated November 28, 1984 Section 5.3.1, "Skill of the Craft" in that the procedure requires activities such as the installation of locknuts to be performed with the "skill of the craft." However, troubleshooting performed by the licensee after the June 9, 1985 event revealed that the spring pack locknut on valve AF 599 was installed backwards and was screwed in too tightly, compressing the spring pack assembly. In addition, the locknut on valve MS 106 was not installed flush with the spring pack of the torque switch causing the valve to go closed with a

torque less than that specified by design. These improper installations did not satisfy the skill of the craft requirements of Administrative Procedure 1844.00.

C. 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires that a test program be established to assure that all testing required to demonstrate that systems and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents.

Section XI of the ASME Boiler and Pressure Vessel Code (ASME Code) established an inservice test program to maintain a plant in a safe and expeditious manner. Table IWV-3700-1 of this Section requires that active valves be exercised quarterly. The Table further requires that if such exercising is impractical during plant operation, then the valves should be exercised at cold shutdown. The Table does not require exercising of passive valves.

Contrary to the above, as of June 9, 1985, the licensee's test program had improperly designated valves AF 599 and AF 608 as passive instead of active as defined in Section XI, Article IWV-2100 of the ASME Code in that these valves are required to change position when actuated by the Steam and Feedwater Rupture Control System. Therefore, the valves were not exercised at the required frequency.

D. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires that measures be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures must assure that the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to the above, the licensee failed to determine the cause of the conditions and take adequate corrective action to preclude repetition of the following significant conditions adverse to quality:

1. Valve AF 599 failed to open from the control room on March 3, 1984 during plant recovery following a reactor trip. The licensee's corrective action with regard to the failure of this valve was not adequate to preclude repetition of the failure in that the licensee did not identify the improper torque switch and torque switch bypass switch settings. The determination of the cause of the failure and adequate corrective action could have prevented the later failure of valves AF 599 and AF 608 on June 9, 1985.

2. Source Range Monitor NI-2 failed to indicate proper neutron level on March 25 and April 13, 1985. The cause of the conditions adverse to quality were not determined and adequate corrective actions were not taken.

3. Spiking and erroneous count rates were experienced from January 1, 1985 through June 9, 1985 on Source Range Monitor NI-1. Five maintenance work orders were initiated to correct these problems. In each instance,, the Technical Specification surveillance test was performed and the channel was declared operable, and the causes of the conditions adverse to quality were not determined.

4. Steam and Feedwater Rupture Control System (SFRCS) half channel actuation trips were received on April 24, 1985 and June 2, 1985. The cause of these conditions adverse to quality was not determined and adequate corrective actions were not taken.

E. 10 CFR 50.55a(h) Protection Systems, requires that for construction permits issued after January 1, 1971, protection systems must meet the requirements set forth in editions or revisions of the Institute of Electrical and Electronics Engineers Standard, "Criteria for Protection Systems for Nuclear Power Generating Stations," (IEEE-279). The Licensee's Updated Safety Analysis Report (USAR), Chapter 7. Section 7.4.2.3.1, "Compliance with IEEE Standard 279-1971," discusses adherence to Section 4 of IEEE-279 and in Paragraph (4.2) requires that no single failure prevent the Steam and Feedwater Rupture Control System (SFRCS) from performing its protective function.

Contrary to the above, as of June 9, 1985, single failure of an auxiliary feedwater containment isolation valve to reopen in response to an SFRCS actuation signal following a main steam line break accident which initially depressurizes both steam generators below the SFRCS setpoint as shown in the licensee's USAR Chapter 15, Figure 15.4.3, would prevent either auxiliary feedwater train from feeding the unaffected steam generator.

F. 10 CFR Part 50, Appendix B, Criterion II, "Quality Assurance Program" requires that the program provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained.

Contrary to the above, as of June 9, 1985 the training provided auxiliary operators on resetting the overspeed trip mechanism associated with the auxiliary feedwater pump turbines was not adequate to assure that suitable proficiency was achieved and maintained in that the operators had not been trained to reset the overspeed trip device for the auxiliary feedwater pump turbine under operating conditions.

Collectively, the above violations in Items I and II have been categorized as a Severity Level I problem (Supplement I).
Cumulative Civil Penalty - $800,000 assessed equally between the eight violations.

III.A. Technical Specification 3.3.3.6, Post Accident Instrumentation, Table 3.3-10, Item 25 requires two auxiliary feedwater flow rate instruments to be in service per steam generator. The action statement associated with the Limiting Condition for Operation requires that with the number of operable post-accident monitoring channels less than required by Table 3.3-10, either restore the inoperable channel to operable status within 30 days, or be in hot shutdown within the next 12 hours.

Contrary to the above, on June 3, 1985, the licensee identified that one of the two auxiliary feedwater flow rate instruments, FI 4521, was improperly wired and thus inoperable since April 1, 1985. During the period from April 13 - June 2, 1985, the Unit was in a mode requiring the instruments to be operable and the Limiting Condition for Operation was exceeded.

B. 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires that activities affecting quality be prescribed by documented instructions or procedures of a type appropriate to the circumstances and be accomplished in accordance with these instructions or procedures.

1. Contrary to the above, an activity affecting quality was not accomplished in accordance with the administrative procedure established for control of jumpers and lifted wires. On March 26, 1985, an instrument and control technician removed Flow Rate Instrument (FI) 4521 from the control room to repair the indicator and did not tag the disconnected electrical lead as required by Administrative Procedure 1823.00, "Jumper and Lifted Wire Control Procedure," Revision 12, dated October 2, 1984. As a result, FI 4521 was reinstalled incorrectly.

2. Contrary to the above, the written instruction "Maintenance Work Order MWO-1-85-1149-01" was inadequate. As a result, the post-maintenance testing performed on April 1, 1985 did not detect that FI 4521 was not receiving the required signal from the auxiliary feedwater flow rate transmitter. As a result, FI 4521 was inoperable until discovered by the licensee on June 2, 1985.

Collectively the violations in Item III have been categorized as a Severity Level III problem (Supplement I).
Cumulative Civil Penalty - $50,000 assessed equally between the violations.

IV. A. 1. 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" requires that activities affecting quality be prescribed by documented instructions or procedures of a type appropriate to the circumstances and be accomplished in accordance with these instructions or procedures. In addition, Criterion X, "Inspection," requires that a program for inspection of activities affecting quality be executed by or for the organization performing the activity to verify conformance with the documented drawings for accomplishing the activity. Bechtel Procedure PDP-2, "Inspection Procedure for As-Built Configuration of Nuclear Safety-Related Piping Components IE Bulletin 79-14," Revision 4, dated May 3, 1980, implemented the actions set forth in IE Bulletin 79-14 for verifying that piping as-built conditions meet design analysis requirements..

Contrary to the above, as of May 31, 1985, twelve pipe supports installed on the Auxiliary Feedwater Pump Turbine Steam Supply system were not installed in conformance with design drawings, notwithstanding inspections performed in 1980 to Procedure PDP-2. In addition, these inspections discovered that the Quality Control Program in place as early as 1976 during plant construction did not provide verification of pipe support location, configuration, and orientation to assure installation was in accordance with design.

2. 10 CFR Part 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," requires measures be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation.

   The Toledo Edison Nuclear Quality Assurance Manual, Sections 15.0 and 15.1.3 which implement Criterion XV of 10 CFR 50, Appendix B, require that nonconformances be documented on nonconformance reports to prevent their inadvertent use.

   Contrary to the above, in March 1985, Toledo Edison Company Facility Engineering Department personnel used controlled sketches to document damaged Auxiliary Feedwater Pump Turbine Steam Supply hangers rather than nonconformance reports as required and, as a result, failed to prevent their inadvertent use or installation.

3. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires that measures be established to assure that conditions adverse to quality such as deficiencies, deviations, defective material and equipment, and nonconformances, are promptly identified and corrected. In the case of a significant condition adverse to quality, the measures must assure that the cause of the condition is determined and corrective action taken to preclude repetition.

   Contrary to the above, during March and April 1985, when substantial defects were identified in the Auxiliary Feedwater Pump Turbine Steam Supply pipe hangers by the licensee's site staff, the licensee failed to adequately assess individual and collective hanger failures to assure adequate evaluation of the root cause of the problem and to ensure that systems were operable in accordance with Technical Specification requirements.

B. 10 CFR 50.73 (a)(1),(2)(ii)(4), and (2)(ii)(B) require the licensee to submit a Licensee Event Report (LER) within 30 days after discovery of a condition that resulted in the nuclear plant being seriously degraded, or that resulted in the nuclear power plant being in an unanalyzed condition that significantly compromised plant safety, or in a condition that was outside the design basis of the plant.

Contrary to the above, the total extent of degradation of piping suspension systems installed on the Auxiliary Feedwater Pump Turbine Steam Supply piping and on the Auxiliary Feedwater Pump Discharge piping that resulted in a condition that was outside the design basis of the plant and that was known to the licensee by March 31, 1985 was not reported to the NRC within 30 days as required.

Collectively the violations in Item IV have been categorized as a Severity Level III problem (Supplement I).
Cumulative Civil Penalty - $50,000 assessed equally between the violations.

Pursuant to the provisions of 10 CFR 2.201, Toledo Edison Company is hereby required to submit to the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 and a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region III, 799 Roosevelt Road, Glen Ellyn, IL 60137, within 30 days of the date of this Notice a written statement or explanation, including for each alleged violation, (1) admission or denial of the alleged violation; (2) the reasons for the violation, if admitted; (3) the corrective steps which have been taken and the results achieved; (4) the corrective steps which will be taken to avoid further violations; and (5) the date when full compliance will be achieved. Consideration may be given to extending the response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Within the same time as provided for the response required above under 10 CFR 2.201, Toledo Edison Company may pay the civil penalties in the cumulative amount of Nine Hundred Thousand Dollars ($900,000) or may protest imposition of the civil penalties in whole or in part, by a written answer. Should Toledo Edison Company fail to answer within the time specified, the Director, Office of Inspection and Enforcement will issue an order imposing the civil penalties above. Should Toledo Edison Company elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalties such answer may: (1) deny the violations listed in this Notice, in whole or in part; (2) demonstrate extenuating circumstances; (3) show error in this Notice; or (4) show other reasons why the penalty should not be imposed. In addition to protesting the civil penalties, in whole or in part, such answer may request remission or mitigation of the penalties. In requesting mitigation of the proposed penalties, the five factors contained in Section V.B of 10 CFR Part 2, Appendix C (1985) should be addressed. Any written answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate statements or explanations by specific reference (e.g., citing page and paragraph numbers) to avoid repetition. Toledo Edison Company's attention is directed to the other provisions of 10 CFR 2.205 regarding the procedures for imposing a civil penalty.

Upon failure to pay any civil penalty due, which has been subsequently determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalty unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282.

FOR THE NUCLEAR REGULATORY COMMISSION

James M. Taylor, Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland
this 13th day of December 1985.

[Whereupon, at 12:40 p.m., the subcommittee adjourned.]

○